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ADDRESS ALL COMMUNICATIONS TO

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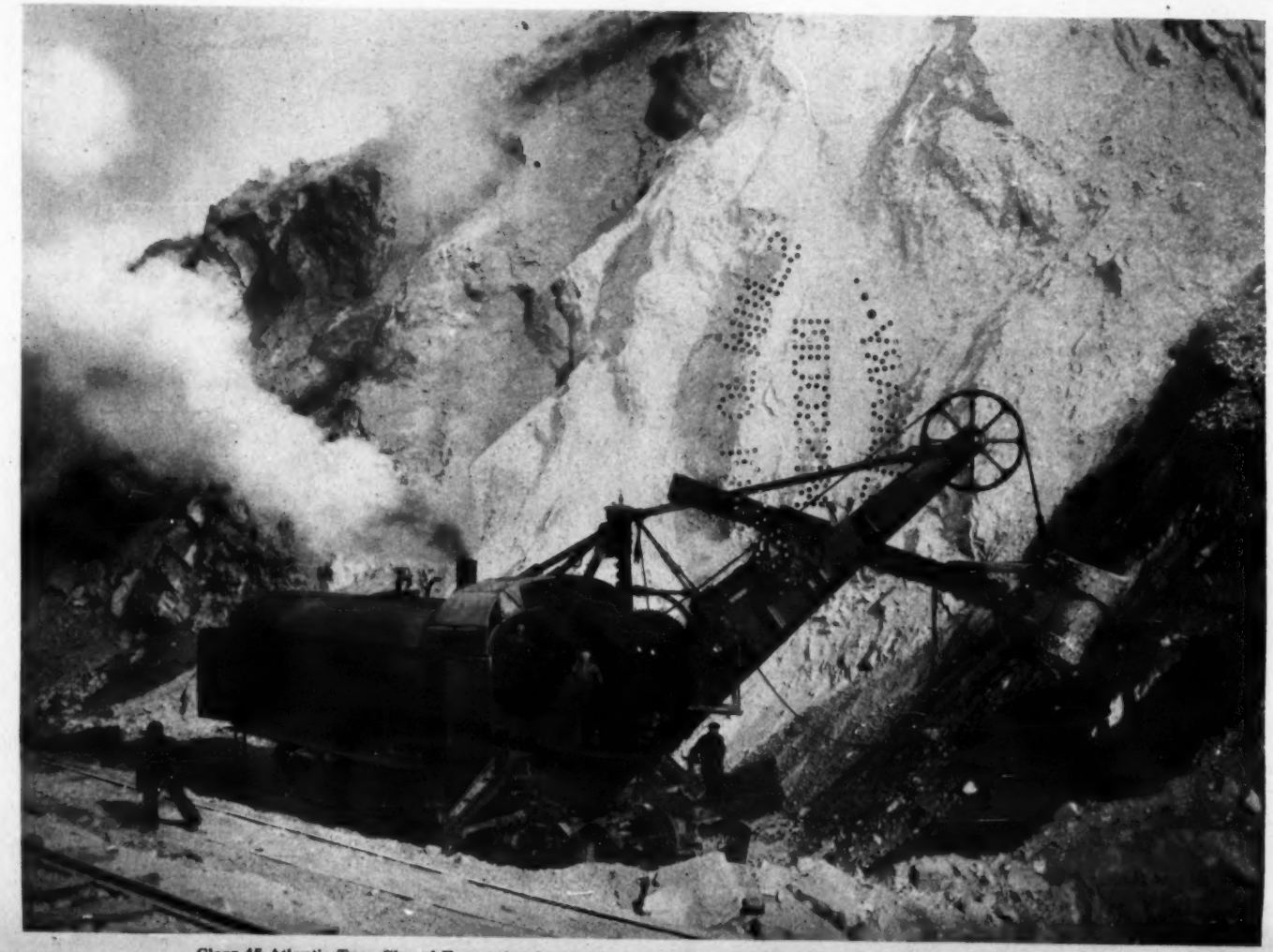

Class 45 Atlantic Type Shovel Excavating for the Arrowrock Dam, Idaho, United States Reclamation Service.

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Excavation Work on the Arrowrock Dam.

IN the canyon of the Boise River, about 22 miles above the city of Boise, Idaho, the United States Reclamation Service is building what will be the highest dam in the world. The Arrowrock Dam, for such is its name, will have a total height of 350 feet and its construction will take from five to six years. It is being constructed in connection with the Boise project its purpose being to store the waters of the Boise River for use in irrigating the valley.

The excavation for the foundation is now completed, and work on the spillway is well under way. The Engineering Record for April 6th, 1912 and February 22, 1913 and the Engineering News for July 17th, 1913, published articles dealing with all phases of the work. Here we will only deal with the excavation.

The heavy floods to which the Boise River is liable have made it necessary to build elaborate diversion works in order to make possible shovel or dragline operation. These consisted in building a concrete lined tunnel 487 feet long with a cross section of 30 feet wide and 25 feet high. Water is diverted into this tunnel and back water is kept off by timber crib, rock and gravel filled, cofferdams. This work took a little over five months to complete. This plan was not decided upon until after very careful study. In his article in the Engineering News, Charles N. Paul, Construction Engineer in charge of the work, states that on account of the uncertainty as to the amount of pumping that would be required, it was considered undersirable to open up the whole of the excavation at one time unless this proved to be absolutely necessary. It was out of the question to consider handling the whole excavation between flood periods, for even though it might have been possible to accomplish the work of excavating alone, it would be necessary in order to be out of danger from floods to place enough concrete in the dam to bring the elevation of the concrete up to the river level, which would involve the placing of from 100,000 to 150,000 cu. yd. Excavating and concreting small sections of the dam by the use of caissons was considered, but was objectionable for several reasons. Finally the diversion work plan was adopted and it was decided first to excavate for, and build a section of the dam along the upstream face extending entirely across the canyon, with a height of about 100 ft., which would bring its top about 10 ft. above the top of the upper cofferdam, and with a cross-section heavy enough to stand by gravity for that height. Under this plan, it was not necessary to open up all of the excavation at once, and it was quite possible, if no particularly bad luck was encountered, that this excavation might be accomplished and the first section of the dam brought up to its full height between flood periods, so that overflow of the cofferdams or any trouble with them during the flood period would not be serious. After this first section of the dam was built it was considered a comparatively simple matter to complete the remainder of the excavation having the completed work to serve as a protection against seepage from the upstream side and as an effective barrier against any flood that might occur.

The excavation for this first section of the dam, amounting to a total of 170,000 cu. yd (including stripping from abutments) has been completed and the concrete work brought up to practically its full height. The excavation is being made to sufficient depth to secure a firm foundation on solid ledge rock, free from open seams. Unusual precautions are being taken to preserve the rock in the soundest possible condition.

The excavation is being done by an Atlantic type class 45 steam shovel fitted with a 2 and a 2½ yard dipper, one 2 yard wooden dragline excavator designed and built by the Hoy and Elzy Construction Company and two orange peel buckets operated from two stiff-leg electrically operated derricks built by the American Hoist and Derrick Company.

Working in conjunction with the shovel are two Vulcan 16 ton and one American 16 ton locomotives, and twenty-five 4 yard Kilbourne and Jacobs and Western dump cars. Across the line of the work are two Lidgerwood cableways. These have one common tower on one side where the hopper is stationed and two towers 275 feet apart on the other. They are equipped to handle skips or clam shell buckets.

In addition to this equipment, there is also a pumping plant. This is intended to take care of the overflow fron the cofferdams during excavation, in case of floods, which often come very unexpectedly.

The plant consists of 8 and 10 inch Byron-Jackson centrifugal pumps belt connected to a motor. These are mounted on trucks which run on two parallel inclined tracks, so that they can be taken out of the hole in case of danger of loss from flood. So far there has been no time when one 8 inch pump did not easily handle all the seepage.

The total excavation for the dam foundations is about 230,000 cubic yards. 170,700 cubic yards were removed in the fall of 1912, 57,700 cubic yards by the shovel and the remainder or 113,000 cubic yards, by the dragline, derricks and hand labor.

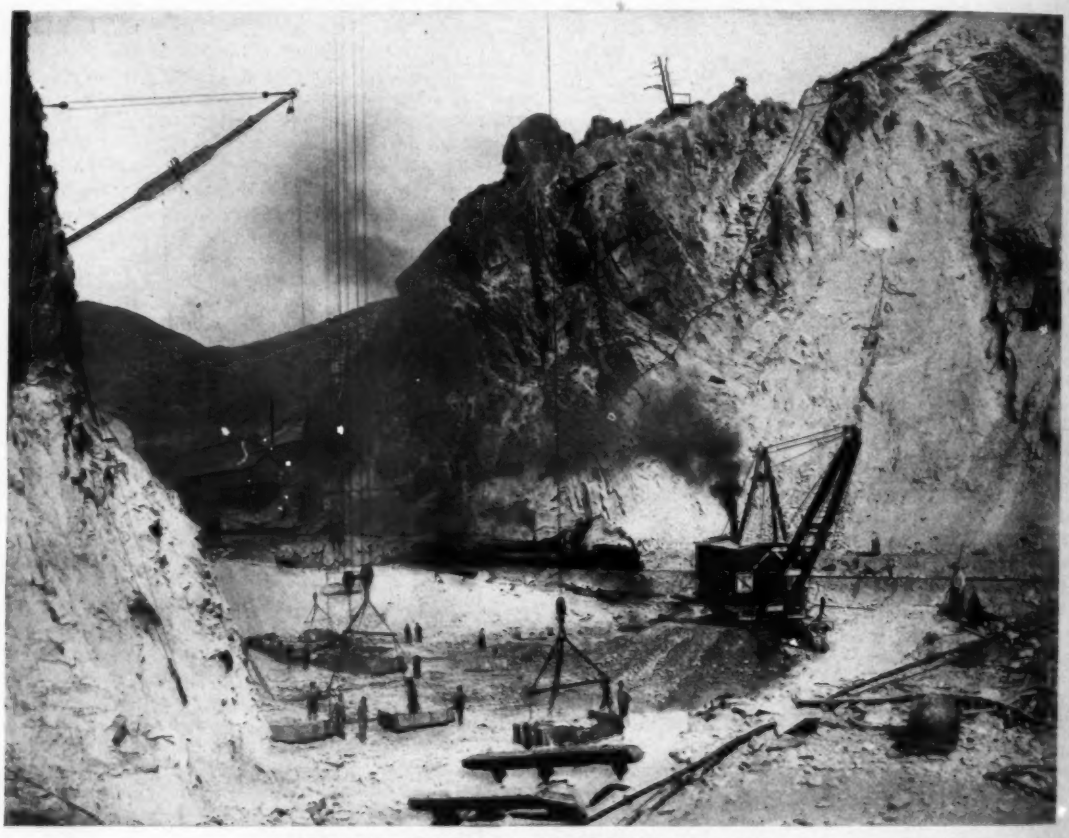
The Atlantic steam shovel was started along the north side of the canyon on February 27th 1912.

UMI

At this time the river was still in its original bed. It had not as yet been turned through the diversion tunnel, but there was a considerable quantity of material above the water level which could be handled before the diversion of the river.

This consisted principally of large granite boulders which had sloughed off the cliffs from time to time, and had become embedded in disintegrated rock and dirty material unsuitable for use in concrete. Fortunately, this material had remained close along the north side of the river and was not mixed to any great extent with the river gravel. Practically all of this, as well as a considerable quantity of loose and seamy granite that was cleaned off the cliff as the work progressed, was moved by the shovel, loaded into dump cars and wasted along the river bank both upstream and downstream from the dam site.

Mr. Paul states that the material was about as hard to handle as could well be imagined. The boulders encountered were of all sizes up to a maximum of perhaps 150 cu. yds. In places they were closely nested together and the spaces between them solidly packed with finer material. In fact, a great deal of the material as it stood was so solidly packed that it was drilled to advantage with Burley drills.



EXCAVATION UNDER WAY, ARROWROCK DAM. Courtesy of Engineering News.

Atlantic Shovel in Background, Loading Cars—Dragline Loading Skips—Block in Foreground suspended from Stiff-Leg Derrick, Loaded Skip just taken from Dragline—The Two Pairs of Blocks to the left are from Cableways, 300 ft. above—Far one taking up Loaded Skip, Near one Dropping Empties for Derrick—Far Stiff-Leg Derrick, Swinging Loaded Skip within reach of Cableway. On the top of the Cliff over the Dragline is the Site of the Spillway where the Shovel is now at Work.—The Diversion Tunnel starts just out of the Picture in the Lower left hand Corner.

Of course, the shooting could not be handled nearly as efficiently as would have been possible if the material had been solid rock. In order to make any reasonable progress therefore, the shovel was necessarily subjected to very hard usage. In the meantime the river had been diverted through the tunnel and steam shovel excavation had been carried down to a depth of about 30 ft. below the river bed. This work progressed without interruption

until about Oct. 10, 1912, when practically all of the material not suitable for use in concrete had been removed and the steam shovel was dismantled and moved to the spillway.

The shovel is now at work on the spillway where about 300,000 cubic yards of rock will be taken out. This part of the excavation will develop into a very interesting and unique piece of shovel work. The material is solid granite with a cut about 100 feet high on one side which will eventually be carried to a maximum of 150 feet. The haul averages about 1200 feet. The coal is taken to the shovel by wagon and the water is furnished by a gravity supply. The shovel is working one eight hour shift per day and is digging at the rate of 1500 to 2000 cubic yards per month.

The remainder of the excavation on the dam site is being handled by the dragline and the derricks. The dragline was placed directly between the two cableways out of danger from rocks that might fall from the skips. Six or eight skips are used by each cableway. These are loaded first on one side and then on the other, so that there is always a loaded one ready to be picked up as soon as the cableways have returned an empty. These skips are dumped into the hopper just below the common tower from which the material is fed into a crusher and used for concrete. The dragline was moved back and forth across the river between the cableways. In the two corners at the south side, on account of the convergence of the cableways, it could not reach all of the material without getting under the cables, hence a good part of this excavation was handled by the stiff-leg derricks. Orange peel buckets operated from these derricks did good work in handling this material as well as in digging the pump sumps.

Some of the excavation was loaded into the skips by hand. It was often necessary to resort to hand mucking in order to keep the cableways busy up to their full capacity, for in some of the material encountered the dragline was not able to load the material fast enough. A good part of this portion of the excavation was handled without any shooting, but is was found advantageous to loosen up some of it with powder. This was done in the night or "graveyard" shift.

Streams of water carried through 2½-in. hose and 1-in. nozzles, and working under 150 lb. pressure which was obtained from a gravity supply, were used to work down the slopes at the up stream and downstream limits of the excavation and to wash the material over to a point where the dragline excavator could reach it.

The organization of the work has been most successful. F. E. Weymouth, supervising engineer of the Idaho District, has divided the organization into an engineering division, in charge of the construction engineer, and a construction division, in charge of the superintendent. This puts the two divisions in the same relation to each other as if the work were done by contract. The engineering division makes estimates and designs and see that the work is built in accordance with plans and specifications, and is held strictly responsible for this end of the work. All work, other than clerical, of the Arrowrock Railroad, the power house at the Boise River diversion dam and its transmission line, is in charge of the construction engineer.

The duties of the construction division are similar to those of the construction force on contract work. This division is held responsible for the progress and cost of the work. C. H. Paul is construction engineer and James Munn, superintendent of construction.

A Job for the Panama Gang

(For the Cleveland Leader.)

Here in the valley of great tribulations,
The old Mississippi is waiting for you;
Save us from cruel and swift inundations;
Here's something nobody ever could do!
Keep back the waters from such a high score again;
Give us a basin with plumbings all new;
Floods, when they come, to be put into store again,
Ready to use at the turn of a screw.
Set back the great Mississippi in bonds again;
Turn your screw loose on submerged Arkansas;
Place back the farmers upon their own grounds again;
Fill up the drift with your great dredge's maw.
Don't send us back to the floods and the fires again;
See, we have toiled without hope years and years;
Flood-relief—Lord must we climb over wires again!
Haven't you something to stop fears and tears!
Is there a river that you cannot harness?
Is there a dam that you can't make secure?
Oh, for our waste and unwisdom don't scorn us;
Leave us no longer such woes to endure!
Come, cross the gulf with all your steam shovels;
Bring us the engines—yes,, all that remains of them;
Bring hope and courage and stay the flood troubles;
Bring the whole outfit—the men, and the brains of them.
Give us a land where we build in security;
Here where the homes of our forefathers sprang.
Give us assurance to reap in futurity—
Here's the next job for the Panama gang!

—Mary Allen Keller

An Egg Story.

Every railroad man in every state will tell you that his company's roadbed is so smooth that there is never a ripple on a glass of water on the dining car, no matter what the speed. And yet comes this story from Senator Henry F. Lippitt of Rhode Island:

An acquaintance, he said was a passenger on a certain line, and going into the dining car one morning, he ordered ham and fried eggs for breakfast.

Minutes passed adding much hunger to the passenger's appetite. Finally the waiter came back with a large bundle of apologies.

"I am very sorry," said he, "but I am very much afraid we can't give you fried eggs with ham this morning.."

"Can't give me fried eggs!" exclaimed the surprised passenger. "Why not?"

"It's this way, sir," explained the waiter. "The cook says that this section of the road is so rough that every time he tries to fry the eggs they scramble."—Louisville Herold.

Moving a Caterpillar Dragline Excavator Over Marsh Land.

THE Husier Drainage District lies about three miles to the east of Burlington, Wisconsin. It consists of about 3500 acres of land, which will be drained by the series of ditches now under construction.

The excavation of these ditches was started about two years ago, but the contractor failed principally because of his equipment, an old fashioned excavator mounted on skids and rollers, which proved utterly unsuited to the conditions.

The ground varies widely in some places a very stiff hard-pan is found, stiff enough in fact to make it practically impossible for a man to force in a spade. In other places we find a peat marsh of the worst kind for dragline operation.

Following the failure of the first contractor, the bonding company awarded the work to Brumm, Chapman & Herman of Milwaukee. After a thorough study of the ground and the conditions existing, the contractors purchased a class 9½ Bucyrus dragline excavator mounted on caterpillars.

This machine weights 58 tons with coal and water aboard, completely equipped for operating and with a full load of dirt in the bucket. It carries a 1½ yard bucket and a 40 foot boom. The main engines are 8″x8″ and the swinging engines 5″x5″.

The contract amounts to about 168,000 cubic yards of excavation, which includes approximately 58,000 cubic yards to complete the main ditch started by their predecessors and 110,000 cubic yards of laterals.

The laterals, six in number, have a top dimension of fourteen feet, bottom two feet, a depth of six feet and a slope of one to one. It may be stated here, however, that the contractors have found it advisable, because of the conditions of the ground, to make the top about 17 feet, the bottom 3 feet and the depth from 6 to 7 feet. The laterals empty into the main ditch, which in turn flows into the lower Fox River, a tributary of the Illinois River.

The observations here presented, were taken on August 20th, when the machine had just finished lateral No. 11 West, which ends at right angles to the track of the Racine and Southwestern Division of the C. M. & St. P. Ry., and was being moved a distance of 1000 feet to an elbow of the same lateral where another branch 600 feet in length was to be dug. (See Fig. 1.)

The ground over which the dragline was moved is a marsh covered with a thick, tough carpet of very heavy marsh grass, tough enough to carry a horse and buggy without any suspicion of sinking in. In fact, from a casual observation, one would consider it good firm ground. Underlying this, however, for a depth of from 7 to 8 feet is a fibrous peat, which in turn covers a heavy blue clay containing parts of shells indicating that it was in former times, the bed of a lake. This peat has the consistancy of a sponge. If taken in the outspread hand it could be compressed to a size a little smaller than a tennis ball, and the water squeezed out. On releasing the hand the ball would gradually recover its former size. The ground, consequently, is very springy. Seated on a piece of timber, one can distinctly feel the quiver made by a man thirty-five feet away shaking the ground by bending his knees. A 1½ H. P. gasoline engine (see Fig. 9) pumping water on the edge of the ditch shook the excavated and dried peat in the spoil pile ten feet away so violently that large pieces three feet in diameter were occasionally broken from the rest of the material.

When ditch No. 11 West was finished, the dragline was standing at right angles to the ditch close to the railway track, as shown in Fig. 2. It was moved directly away from the ditch a distance of 70 feet, slewed and moved parallel to the ditch a distance of 1000 feet. The ground was level, of the same consistancy as above described the whole length of the move, although a little softer at the near than at the far end.

The crew was too small for record time. It consisted of an engineer, a fireman, and four men on the ground. (Messrs. Brumm, Chapman & Herman were three of the four ground men,) consequently, the figures given below should not be construed as indicating anything, but the efficient handling of a caterpiller dragline by a small crew under the most disadvantageous conditions.

Including all delays for taking in water, blocking, pulling out of bogs and slewing the machine at the start, the 1000 foot move over the marsh was made in seven hours and twenty-five minutes. The start from the ditch was made at 10:25 A. M. Brush and timber were laid ahead of the machine under each caterpillar for a distance of thirty feet. (See Fig. 7.) The machine was moved up and the timber carried around and used again. Seventy feet from the ditch they started to slew. This consisted in disconnecting the right hand caterpiller, propelling with the left and advancing ten to fifteen feet, laying timber again and going through the same process. The machine was parallel to the ditch at 11:35. The right angle turn was made in an arc measuring 33 feet 4 inches. The progress of moving straight ahead was similar. Timber was laid under each caterpillar for thirty feet, the machine was advanced, the timber picked up

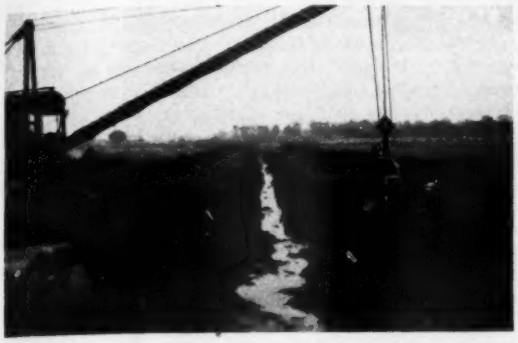


Fig. 1—Finishing up the lateral. The move was made through field to left to bend in lateral shown in the distance.

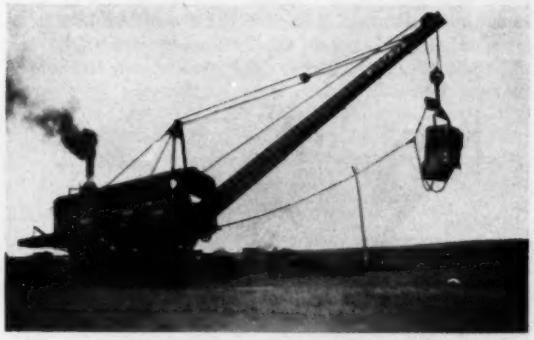


Fig. 2—Moving away from the ditch. Easy going.

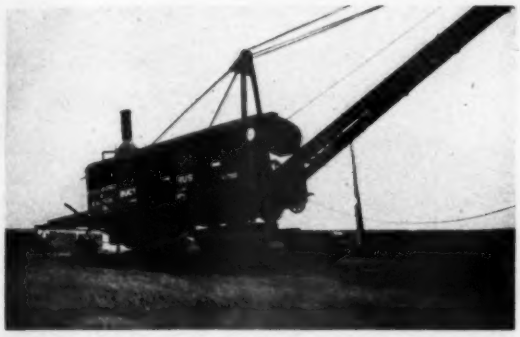


Fig. 3—Starting to slew. The man beside the machine is disengaging propelling clutch of right hand caterpillar.

Fig. 4—Heavy going. Carrying timber to front of machine.

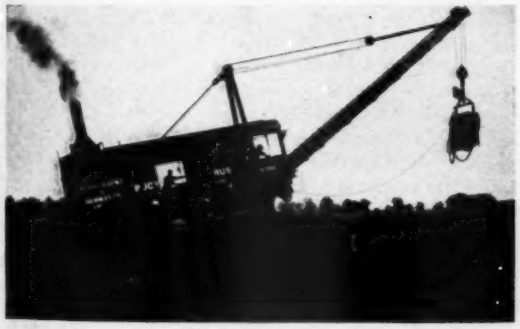


Fig. 5—Traveling through very soft material.

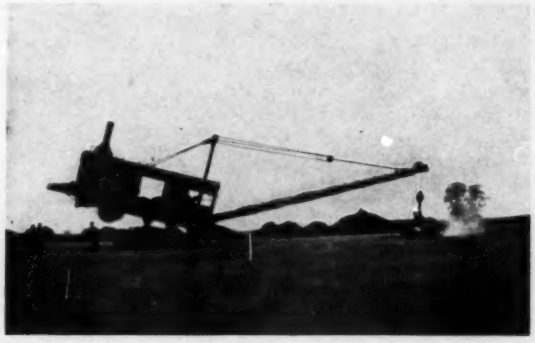


Fig. 6—Swung around and bucket dropped to take weight off down end.

THE PROGRESS OF THE DRAGLINE THROUGH THE MARSH

and carried ahead again. The average time consumed in carrying the timber around was 12 minutes, when the timber was not badly buried by the caterpillar. The move itself was made in about 30 seconds.

Fig. 7—Slewing. Note brush thrown in front of machine.

The log of the afternoon's move is illuminating as far as the numberless difficulties and delays encountered are concerned. The start was made at 1:15 P. M. A bog was encountered at once. The machine sunk on the rear left side, seeming to slip off the timbers sideways. The ash pan touched the ground and the sprocket on the caterpillar was buried 1½ feet. The predicament of the machine may be seen from Figure 4. The machine was carefully swung on the turntable until the boiler or heaviest part was over the high end. The bucket was dropped on the ground and the crew proceeded to block ahead of the machine

Fig. 8—Pulling out. Progress shown by angle of hoisting cable. Man near machine is digging out buried caterpillar. Starting point shown by man in foreground.

preparatory to pulling out. This was made difficult as most of the timber had been partially or completely buried by the caterpillars. These were pulled out for the greater part by the machine with the aid of the dragline rope and a chain, after having been exposed with a spade. Blocking proceeded from 1:16 to 1:35. It was then found necessary to dig out around the rear left hand caterpillar, as the mud had choked it. At 1:56 the machine was out. It was then discovered that one of the 6″x12″x8′ timbers had been driven inward when the caterpillar sank and had become lodged with its high end against the inside of the rear base channel and embedded in the mud and therefore not noticed. Consequently as the machine advanced it was driven down and forward forming a bad snag. The dragline had not only pulled itself out but had pushed this obstruction aside. About half an hour was now consumed in timbering and in re-piping water to the tank. The water was pumped from the excavated ditch by a 1½ H. P. gasoline engine connected to a hand pump. The whole is mounted on skids for easy moving. We publish a photograph of this device below. 600 feet of inch pipe and 50 feet of hose were used.

Fig. 9—Pumping water to the dragline.

At 2:30 they were off again, but on the same move sunk a little deeper than before. (See Figs. 5 and 6.) 3:20 saw them out again. The sinking was so frequent that it was impossible to get any accurate figures on the rate of speed of the caterpiller. From this point on, however, the machine although constantly deep in, did not get as badly mired. The last 350 feet, indeed, were covered without the use of planks. It was felt that these had a tendency to cause the machine to slide sideways, and consequently sink deeper, therefore when a little higher ground was encountered they were discarded with no bad results. The move was finished at 7:30 P. M.

The next day when moving across a bog of black muck, the machine had a yet severer test. The ground had no supporting sod and the dragline sunk until the sheave on the boom touched the ground, the bucket having been swung to one side, and the swivel sheave was buried in the mud. The machine had been traveling without planks and had sunk

with both caterpillars even. Without any planking, it pushed through this muck for fifteen feet, then struck more solid material and climbed out.

It is hard to conceive a more exacting test for the caterpillars than this performance. The move was made without the slightest mishap.

The dragline has proved itself a very fast digger. On the lateral work above described, it has averaged two and one half swings to the minute, swinging through an arc of from 40 to 45%. For three days when working under the conditions described, it advanced 600 feet a day, or dug about 1500 cubic yards in ten hours. Otto Momsen, who erected the machine for the Bucyrus Company, states that under better conditions it can easily do more. Mr. Momsen also makes the statement that in 9 minutes it dug 16 feet of ditch, which means digging at the rate of 280 cubic yards an hour.

The operations are directly under the able supervision of the owners, Albert Brumm, William Chapman and William Herman.

The Kennedy-Hamilton Construction Company's Contract at Youngstown Ohio.

By L. T. Russell

Early in May 1913, a contract was awarded The Kennedy-Hamilton Construction Company, of New York City, by the Youngstown Sheet and Tube Company to dig a new channel for the Mahoning river in the immediate vicinity of the present steel plant.

70C Bucyrus loading cars.

The purpose in changing the river from the old channel to the new one now under construction is to provide room for future extensions of the steel plant, and additional yard space, etc. The new channel will be about 2,800 feet in length, 220 feet in width, with the sides sloped on a grade of 1¼ to 1. the fall or grade in the channel is to be 1-10 of one per cent. The contract amounts to about 375,000 cubic yards, the material consisting of clay with some gravel at the bottom. The contracting company are using one 70 ton and one 70-C Bucyrus shovels, one 18 ton and three 20 ton Vulcan dinkeys and about 50 four yard Western cars. Besides this there is at present an excavating cableway on the job. The shovels and car equipment are being used on the canal proper and the cableway is to be used in digging out the approaches at the upper and lower ends where a considerable part of the work must necessarily be done under water.

70 ton Bucyrus at work.

At the lower end of the new channel a cofferdam of concrete piling will be built across the old river channel, which will gradually be filled up as the work of plant extension goes forward. The contractors expect to complete the work by January 1st, 1914.

At the present time material is being excavated at the rate of 1,150 cars per day.

In addition to the excavation the company have the contract for a sewer 900 feet long and 6 feet by 6 feet inside diameter. This sewer is an extension of the present local drainage system and serves to extend the sewer from its present terminus in the old river channel across the reclaimed land to the new channel.

About 150 men are employed by the contractors Mr. R. B. Kennedy and Mr. J. J. Hamilton, their principal assistant being J. P. O'Brien, superintendent, W. F. Scanlan material man and time keeper, while the shovels are being operated by J. A. Kask, and P. D. O'Brien, assisted by Frank Sheehan and Mike Welch, cranesmen.

He held the maiden's hand and said:
"May I the question pop?"
She coyly bent her pretty head—
"You'd better question pop."
—Cornell Widow.

Coal Stripping in Kansas—A Description of a New Industry

By W. S. Russell

IN southwestern Kansas, with Pittsburg, a city of 18000 people, as the business center there exists an extensive and only partially developed field of good bituminous coal.

This coal lies in horizontal veins from 18 inches to 4 feet thick and at depths varying from 8 feet to 200 feet below the surface. The so-called deep coal lying from 40 feet to 200 feet below the surface has been mined for many years by the underground method of sinking a shaft and drifting into the coal. This coal has almost universally a strata or roof of blue shale or slate directly over it, which supports the earth above so that it does not cave in when the coal is removed. The veins of deep coal are usually 3 feet thick. The shallow or surface coal will vary from 18 inches to 4 feet thick, but most of it will average 3 feet in thickness. This coal down to about 15 feet below the surface has been stripped by teams and scrapers for the past 20 years; the overburden consisting of soft brown or grey shale or soap stone and sandy clay. The expense of such stripping has varied from 13 cents to 15 cents per cubic yard. But when the depths reached 15 or 16 feet, this hand stripping had to be abandoned as at a greater depth the spoil bank out of the pit became too steep for a team to climb, and consequently the cost per ton of coal uncovered was prohibitary. As the amount of coal stripped in this manner has not been very extensive, there now exists thousands of acres of strip coal from 12 feet to 40 feet below the surface, available for stripping with revolving steam shovels which have recently been developed particularly for this purpose. There is also a large amount of coal of 18, 20, 22, 24 and 30 inches thick lying from 8 feet to 20 feet below the surface that may be stripped profitably by this new method.

175B Bucyrus Shovel, fitted with a Dragline Boom—Scott, Smith & White, Pittsburg, Kans.

The first shovels of this type were designed and built by the Vulcan Steam Shovel Company of Toledo, Ohio in 1910 for companies at and near Pittsburg, Kansas. Three of them were installed in February and March 1911. Since then, 21 revolving steam shovels have been sold to concerns in this field, making 23 shovels now working including the three Vulcan shovels first mentioned. Of the 21 shovels, part of them are Bucyrus and part of Marion make.

During the past 13 months, 8 Bucyrus shovels have been sold in this field against 2 of the Marion type.

There are two sizes of revolving steam shovels built by both companies which seem to fill all present requirements of coal stripping: The 150 ton shovel with a 60 foot boom and a 2½ yard dipper having a capacity of 1800 cubic yards per day of 9 hours; and the 185 ton shovel equipped with a 75 foot boom and a 3½ yard dipper with a capacity of 2300 cubic yards per day of 9 hours.

These shovels will handle from 10 feet to 35 feet of overburden to good advantage, which at the present price of coal is the limit at which a vein ranging from 18 inches to 3 feet may be worked profitably. The expense of operating these shovels will average from $1000.00 to $1300.00 per month according to the size of shovel, which makes the cost of stripping from 3 cents to 4 cents per cubic yard varying of course with the conditions, the class of material handled and the yardage actually dug per month. It is customary to figure 20 working days per month in estimating the amount of material handled and of coal taken out.

Where the coal is 3 feet thick it will average 4000 tons to the acre net, after an allowance has been made for horse-backs. Horse-backs are ridges of fire clay from 3 feet to 4 feet thick with a depth equal to that of the coal vein, extending irregularly through the field. They are usually estimated at 10 per cent of the coal. The coal itself will average a ton under every square yard of surface uncovered.

Directly under the coal there is from 3 feet to 6 feet of fire clay which is sufficiently firm to support the tram tracks and cars used to take out the coal. In some parts of the Kansas field irregular strata of hard blue shale varying from 6 inches to 5 feet overlie the coal. This shale is not too hard to prevent the steam shovels from digging it, in most cases, without blasting. In some places there is also a soft sand rock from 2 feet to 10 feet in thickness overlying the coal, but this is also quite irregular and broken and can be easily handled by the powerful steam shovels. These deposits are not general and but few of them have been encountered by the 23 steam shovels now working in this field. The shale is usually soft and easily dug.

The usual method of taking out the coal has been to run two or three or more light tracks into the pit up to the breast of the coal and load the two ton tram cars by hand. The cars are hauled to the end of the pit by mules or horses, then by means of a steam or gasoline winch they are pulled up the slope to the main ground level. Thence to the tipple by mules, horses, or by a wire rope cable, if the distance is not too long, say up to 1000 feet.

New methods, however, are now being tried out and radical changes will no doubt be made. Several coal strippers are using 10 ton dinkey locomotives to haul the cars out of the pit and up to the tipple where the distance is from one quarter to half a mile or more. One firm has a mile haul and the engine pulls a train of 12 to 15 tram cars over the road in less than 5 minutes. Another firm are using

150B Bucyrus Shovel, Stripping—Coal being mined in foreground. Warren Engineering Co., Clay City, Indiana.

Mining and loading coal, Moka Coal Co.

a revolving crane with an 80 foot boom which is placed on the main ground level near the edge of the bank. The tram track is placed also on the main ground level back of the revolving crane. The long boom reaches over into the pit, picks up a loaded tram car, lifts it out of the pit and places it on the loading track, picks up an empty car and lowers it into the pit in the space of four minutes. The tram cars are of 4 tons capacity each. These cars are then hauled to the tipple by a dinkey locomotive.

Another method is to place a revolving crane on top of the coal having the tram track on the main ground level near the edge of the bank. Pick up the empty cars on the tram track, lower them into the pit, pick up the loaded car, lift it out of the pit and place it on the loading track. This can be done at the rate of 20 cars an hour or 500 tons of coal per shift of 8 hours.

The advantage of this method lies in being able to avoid the delay otherwise caused by encountering horsebacks. For in the old method, with the tram tracks in the pit it became necessary to dig through these ridges of fire clay in order to permit the tram cars to pass. With the revolving crane, however, this is avoided. The crane is moved up a few feet on the coal so that the men loading the cars can break into the coal on the other side of the horseback which leaves it intact and undisturbed. Other advantages in this method are in doing away with the necessity of maintaining hoisting engines to pull the cars out at ends of the pit, and in fact that a single track on top of the bank can be maintained at much less expense than several tracks in the pit. Tracks and switches laid in the pit are usually more or less covered with mud or water and must be frequently shifted.

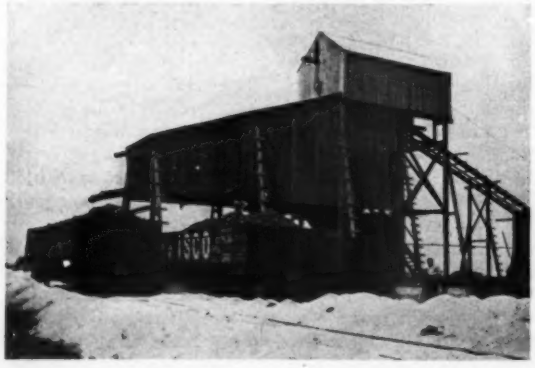
Revolving steam shovels of small size are now being used to load the coal with satisfactory results. A shovel of about 30 tons weight with a 1½ yard dipper is very suitable for this purpose as it has sufficient reach to load 40 feet in width of coal, which is an advantage in a pit from 40 feet to 80 feet in width, as in 80 feet of width the shovel can make it in two cuts loading the first half into tram cars placed on top of the coal and then by shifting the track to bottom of the pit, take out the other half.

The advantage of having a string of 10 or 12 cars to load at a time would be greatly appreciated.

When horse-backs are encountered they may be readily dug out by this steam shovel and deposited in a convenient place behind it at one side of the pit.

The fact that Kansas coal is in good demand having a reliable market which is becoming better every year and that strip coal is preferred to underground coal, is a great inducement to parties having means to engage in the coal stripping business. Furthermore the profit in coal stripping has proved to be very attractive.

The coal output of the Kansas field is about 6 million tons a year of which at the present time about one million tons are produced by the coal stripping steam shovels.



Two views of the tipple of the Moka Coal Co. at Pittsburg, Kans.

"When an Irresistable Force Meets an Immovable Body"!

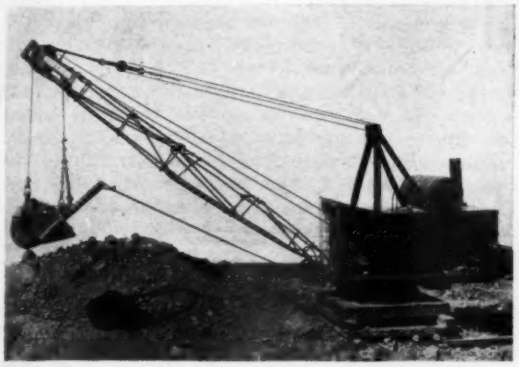
This photograph shows, what at one time was the head of a 6 pound axe. This axe was dropped accidently into the swinging gear of a class 24 Bucyrus dragline excavator operated by the Southern Dredging Company, near Baton Rouge, Louisana. The dragline at the time happened to be swinging, and the axe became lodged in the gearing. The gearing was unharmed and the dragline kept on swinging.

The photograph bears mute testimony as to what happened to the "immovable body"!

This 6-lb. axe fell into the swinging gear of a Bucyrus dragline excavator.

"Imitation is the Sincerest Flattery."

The machine in the photograph reproduced below has the familiar lines of a class 14 Bucyrus dragline excavator. It is shown, apparently in the act of swinging a load. If one should look a little closer, however, it might be noticed that the boom, instead of being of the usual construction is apparently



made of bar iron, and the sub-base of wood instead of structural steel. As a matter of fact, this is not a Bucyrus dragline, but a very clever model of one made by Arthur Heisler, a fifteen year old boy.

The boy, whose brother Leo Heisler was one of the operators for the Essex Construction Company on their Barge Canal contract at Albion, New York, had spent much time watching the machine and had become very familiar with its details.

The boom is 2 feet 3 inches long and the other parts in proportion. The house is fashioned from a soap box, the tank from an old dry battery, the smoke stack from a piece of bicycle tube and the boom from No. 9 wire. The bucket is made of sheet iron and brass and digs like the original when the cords, which take the place of the cables, are manipulated.

We are indebted to Mr. Charles C. Heustis, general manager of the Essex Construction Company for this photograph and the above information.

The Excavating Engineer

[FORMERLY STEAM SHOVEL NEWS]

A Monthly Publication Devoted to Excavating *and* Allied Subjects

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THE EXCAVATING ENGINEER PUBLISHING CO.

Bradley Van Brunt, Manager *and* Editor

267 National Avenue Milwaukee, Wis., U. S. A.

With this, the first number of the second year of *The Excavating Engineer* in its present form, it seems but proper that we should reiterate for the benefit of those who have but recently come "within the pale" our policies and our aims.

The Excavating Engineer was published for eight years under the name of The Steam Shovel News. A year ago it was enlarged, improved, clothed in a new dress and published under a new name.

With the unprecedented growth in the use of labor saving machinery for excavation there has come to be a greater and greater need for a magazine, which could devote itself to the promulgation of new methods and new devices. We have endeavored to fill this need. We have striven to make the primary qualifications for the publication of an article, not only the current interest thereof, but the material therein which might prove of value and of interest to our readers, especially to those readers who are seeking for information concerning new methods and devices of excavation.

By this, the first year in our new dress and under our new banner, our readers may judge us. They may feel assured furthermore, that during the months which will come to make up another year, our aim will be to improve upon what we have done, with the hope that *The Excavating Engineer* may be for them an organ of real service. To this end we earnestly solicit their criticism and their co-operation; their criticism by telling us where we have gone wrong, and in what direction we may improve; their co-operation, by frequent contributions to our pages.

Construction Outlook.

Railroad construction still seems to be at a minimum. At the bottom the country is healthy, but there seems to be a temporary depressing condition existing. Sensational reports have been circulated about the crop conditions. The severe draught in Missouri, Kansas and Oklahoma, will cause a marked shortage in corn, but other crops seem to be splendid. The uncertainty about the tariff situation and the dissatisfaction with the currency bill have been other aggravators, while the Mexican unrest is extremely unsettling. Despite this, the gross earnings of the railroads have improved wonderfully, an improvement which indicates a great increase in efficient management. But the railroads are not making satisfactory profits on the volume of business they are handling. The net earnings for instance, of the New York Central, and the Pennsylvania, two of the strongest roads in the country, have actually fallen off despite the increase in the gross receipts. Investors cannot be expected to purchase railroad securities merely because the roads are doing a good business. The roads are aware of this and the result has been that few projects are under consideration. Some branch line construction, grade reduction and revision work is under way, but no one dares to promote new work.

If the currency and tariff bills are satisfactorily disposed of things may improve, but until the public at large and the legislators take a fairer attitude as regards the railroads, we cannot expect the sky to be cloudless.

To return to railroad construction, no contracts of any size have been placed this month. Adams & Sullivan have some work on the Lexington & Eastern, and A. J. McDonald of Victoria, B. C. associated with some Seattle contractors have 20 miles of construction near Victoria on the Canadian Northern. This is all there is worth mentioning.

Other lines are keeping up well. Many railroad contractors are taking levee work, to-wit; Walsh Brothers and Fred R. Jones near Cairo. Highway work is active, expecially in Massachusetts, Pennsylvania, and New York, while Washington is showing signs of activity. The Canadian Government is also busy with the Welland canal, as we have mentioned before, and section 3, amounting to $10,000,000 has been awarded to M. J. O'Brien and Hugh Dougherty. Sections 2 and 4 will also be disposed of soon. Irrigation and drainage work have also held their own.

Speaking of Mexico—there are some of us who feel called upon to admire Mr. Wilson's wise, suasive diplomacy, and yet, there are occasions when even we secretly confess to ourselves, our strong temptation to endorse the old-fashioned fatherly method expressed in the following lines from the pen of Mr. Berton Braley:

I'm strong for the modern-time efforts at suasion,
And "reason" is better by far than the rod,
But nevertheless there is sometimes occasion
For treading the ways that our ancestors trod;
These up-to-date fashions on which we are banking
Must sometimes be bolstered by measures more grave;
It's then I believe in the old-fashioned spanking,
The olden-time spanking that made us behave,
The genuine spanking,
The hard-handed spanking,
The long-deferred spanking,
That made us behave!

Progress Towards Special Drainage Legislation

The National Drainage Congress, in its short life, has done more to bring about a national, comprehensive work of flood protection and swamp land reclamation than any other organization.

As a result of the efforts of a special committee of this congress, the Secretary of the Interior and the Secretary of Agriculture has each promised to detail one of his principal assistants to work with the sub-committee in drafting a bill providing for the work of flood protection and swamp land reclamation under national control.

Speaker Clark and Vice-President Marshall promised the Committee that such a bill would pass at the next regular session of Congress, if properly prepared, and advised its preparation by a special committee with a strong engineering representation upon it. President Wilson was seen and invited to attend the Fourth National Drainage Congress at Savannah, Ga. next spring. Secretaries Garrison, Lane and Houston, and many Senators and Representatives of all parties were seen and all assured the committee that the legislation could be secured at the next regular session.

The Committee preparing the bill consists of: Chairman, E. J. Watson, Columbia, S. C.; State Commissioner of Agriculture, Commerce & Industries; Thomas P. Littlepage, attorney, Washington, D. C.; Frank B. Knight, Chicago, consulting engineer and expert on excavating and drainage machinery; Morris Knowles, consulting engineer, The Flood Commission of Pittsburgh; J. L. Craig, President of the River Regulation Commission of Stockton, Calif.; L. L. Lawrence, Laurel, Miss., Treasurer of the Railway Development Association; Joseph Hyde Pratt, State Geologist, Chapel Hill, N. C.; J. S. Spiker, consulting and sanitary engineer, Vincennes, Ind.; and Reid Whitford, Engineer for the Sanitary District of Charleston, S. C.

Culebra Cut Flooded.

On August the 31st, the last barrier between the Miraflores locks and the Pacific end of the Panama canal was destroyed and the water allowed to enter. On September the 6th instead of the September 15th, as originally planned, the last bit of dry excavation was completed, 36 miles of track have been removed from the 9 mile channel between Gamboa dike and Pedro Meguse locks. By the time this number reaches many of our readers, Culebra cut will have been flooded and Gamboa dike will have been blown up.

According to the Canal Record, the last remaining barrier at the Pacific end was destroyed at 9:30 the morning of August 31st. This dike composed of a trestle fill of rock and earth, prevented the water from the sealevel channel from entering the steam-shovel cut 5,000 feet long, 500 feet wide, and 46 feet below mean tide, extending to Miraflores Locks. The Rio Grande diversion was turned into this pit on August 23, but the depth of water had only reached about 15 feet by Sunday. About 37,000 pounds of 45 and 60 per cent dynamite were used, the charge being placed in 541 holes at an average depth of 30 feet. A large crowd of spectators was present and pictures of the blast were taken by numerous kodaks, and one moving picture machine.

At the time of the explosion the water in the channel, south of the barrier, was nearly at low tide. The dynamite tore a gap in the dike about 100 feet wide, but as the bottom of the gap was still at some height above the existing tide level, no water passed through. An 18-foot tide was predicted for Sunday, with its maximum at 3.12 p. m., so that before high tide water was expected to flow over the gap in the dike. This expectation was fulfilled a little earlier than was anticipated for, at 1.35 p. m., the water in the sea level channel was nearly even with the top of the gap. At this moment a man with a shovel made a small trench across the dike through which a small stream of water began to flow. This rapidly increased in size until 40 minutes later, an opening 30 feet wide had been made, through which a torrent of water poured in a 30 or 35-foot fall. The rush of water ate away the sides of the opening steadily, carrying large sections of the dike, including trestle bents, and other debris, into the pit. The increasing volume of water filled the pit rapidly, and at 3 o'clock, one hour and 25 minutes after the water first began to flow over, the level in the inside channel was that of the outside channel, while the gap had been widened to 400 feet, or more. Some of the sixth division floating equipment was anchored in the sealevel channel just above the break of the barrier, and when the suction of the current was at its greatest, a barge was cut loose, and was carried through the gap with sufficient force to part a heavy steel cable which had been left strung across it. The barge then drifted slowly up toward the locks.

All the bottom material in Culebra cut has been drilled and blasted preparatory to its removal by the dredges. It is estimated that about 650,000 cubic yards remain to be taken out in this manner.

This is exclusive of all slide excavation, and does not include removal of any of the inclines.

It is the intention to retain ten of the best conditioned shovels in service, using them in the work of removing material from the east and west banks, near Culebra, to lessen the danger from slides. About six of these machines will be employed on the east bank and four on the west bank, probably until May, 1914, and an organization sufficient to man and look after the shovels is now under consideration. Two of the shovels picked out for this work were wrecked beyond the point where it would pay to repair them, in a slide on the east bank, opposite Culebra village, on Sunday night, August 17.

The greatest steam shovel job the world has ever seen has been completed.

Subject of Cover Illustration

The illustration on our front cover shows the Isthmian Canal Commission's 70 ton Bucyrus shovel, Commission number 134. This shovel, according to official reports, holds the canal record for the daily output of a shovel of this class. Other reports go so far as to say it is the world's record, but at this writing we have no detailed figures as to the exact working time, nor are we in possession of the requisite data to warrant a comment thereon. The fact remains however, that official records state that this shovel dug 3910 cubic yards of material in an eight hour day, which is higher than any other 70 ton shovel has made in the canal zone.

Shovel number 213, a 95 ton Bucyrus, holds the daily Isthmian record for all classes of shovels, having dug 4823 cubic yards of rock and earth in eight hours, although idle 160 minutes waiting for cars, and other delays.

If any of our readers know of higher records for this period, we would be glad to receive figures thereon, with a description of the material handled.

A Tardy Acknowledgment

As a part of our editorial policy we have always endeavored to give credit where credit is due. When it is found advantageous to borrow from an article in another publication bearing upon a subject with which we are dealing, we believe it adds to the value of our article to give credit to that publication for the portion we borrowed. This is doubly true in the case of a journal of the calibre of the Engineering News. In the September number of *The Excavating Engineer* we published an article describing the construction work on the Cape Cod Canal. The map which we used on page 447 and the description of the physiography of the country, were taken from an excellent article on the canal published in the Engineering News of January 9th, 1913. In line with our usual policy we intended to credit the Engineering News therewith, but through an oversight the issue went to press without due credit being given. A tardy acknowledgment is consequently in order.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review in this column such books and catalogs as are sent to us. Books reviewed in these columns will be supplied by The Excavating Engineer Publishing Company at the prices named.

Excavating Machinery, by A. B. McDaniel, B. S. 340 pages, 6" x 9" illustrated, cloth bound, price $3.00 net. This book is based upon a set of notes used in Professor McDaniel's class room in the University of Illinois, and afterwards expanded to meet practical needs. It is a well illustrated book devoted to the description of excavating machinery of various kinds and the uses for which each type is devised. Marine dredging is not dealt with. Cost data has been given wherever practical, with a brief description of the particular job considered. Except for a failure to give due consideration to the breadth of the field of work to which the dragline excavator has recently proved itself adaptable, the book should be very instructive to those for whom it was intended, namely: the farmer, the land owner, the promotor, officials in charge of public works and others who have had no other previous experience with the subject.

McGraw-Hill Book Company, New York.

Modern road construction by Francis Wood, M. inst. C. E., F. G. S. 5/8 illustrations. A colored map and a chart, 133 pages.

Modern road construction by Francis Wood M. Inst C. E., F. G. S. 25 illustrations. A colored map and a chart, 133 pages, 5"x7" cloth bound, Price $1.50 net. A practical treatise for the use of engineers, students, etc.

Contents: Introductory, Macadam Roads. Wear of Roads. Effect of traffic on Roads. Tarred Roads Bitumen. Methods of using Tar and Bitumen. Rollers and Rolling. Paving Cost of Maintenance of Roads. Appendices, Index.

The author has brought together in concise and not too technical form a series of notes which he has accumulated over a peroid of years of careful, systematic and detailed inquiry into the problems of construction and of disintergration.—J. P. Lippincott Company, Philadelphia, Pa.

Concrete Sidewalks, Pavements, Curb and Gutter. Paper covered book, 6"x9"-96 pages. Illustrated. Covering briefly the underlying principles of good design and good construction and including the specifications of the National Association of Cement Users, as presented at their December 1912 meeting. Universal Portland Cement Company, Chicago, Illinois.

Specifications for Construction of One Course Concrete Street Pavement. A 30 page pamphlet, 6"x9", paper cover. complete specifications prepared for engineers, containing clauses not generally included in specifications, but deemed necessary to provide for contingences. Published by The Universal Portland Cement Company, Chicago, Illinois.

Civil Engineers Pocket Book, by Albert J. Frye, M. Am. Soc. C. E.—1,658 pages 600 tables, 1200 illustrations. leather cover, 4½"x7", price $5.00 net. A new reference book for engineers and contractors. A condensed treatise on civil engineering. A convenient table of contents and index, making it very accessible. The tables have been prepared regardless of time and expense. Many of them now appear for the first time. A library of text books one convenient pocket book. D. Van Nostrand Company, 25 Park Place, New York.

FIELD NOTES

DISCUSSION IS INVITED FROM MEN IN THE FIELD ON SUBJECTS HERE PRESENTED

Safety Rules for Steam Shovels.

The following rules were recently reprinted by the Coal Age from the Inland Steel Co's book of safety regulations; they may offer some good suggestions to our readers.

A proper signal should be given before a steam shovel is moved on its track.

Steam shovel engineers should make a daily inspection of the machine under their charge and of all the cables and chains on their shovels, and report defects immediately to the master mechanic.

See that ladders, footboards, hand holds, running boards and steps are kept in constant repair and free from cans, grease, snow and ice.

No person whose duty does not require it should be permitted on steam shovels.

No gasoline should be kept inside of a steam shovel.

No person should be allowed near any car being loaded at a pocket or by a steam shovel. Warning is given that chunks of material frequently roll over the side of cars being loaded and it is an extremely dangerous practice to be around or near the same at such times.

Banks alongside steam shovels should be trimmed down of all loose material. Bank trimmers should notify men working below them. Men should not stand behind the shovel.

Proper care should be taken to prevent trestle legs from falling and injuring workmen.

Keep away from in front of the shovel to avoid being crushed between dipper and track; do not attempt to pass under the dipper.

Chain or block steam shovel and cars when set on grade and apply the car brakes.

Short whistle blasts on steam shovels and locomotives should signify, "Look Out for Blast." Two long whistles should signify that blasting is over and work may be resumed.

Care should be taken to keep black powder well covered when charging holes in open pits and to leave none scattered around the holes. Sparks from locomotives or steam shovels may cause an explosion.

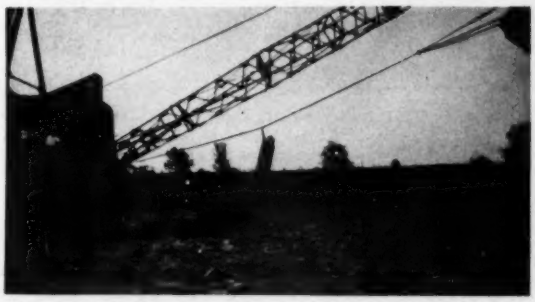
Men dumping stripping cars should step back as soon as toggle-chains are knocked off and cars dumped.

Shovels under steam should not be left without a competent man in charge.

An Easy Method of Moving Plank on Dragline Work.

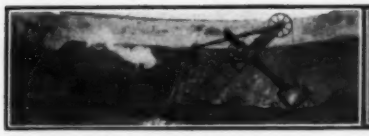
The Southern Dredging Company are using a very simple but extremely effective time and labor saving method of moving their planks from the rear to the front of their dragline excavators.

The general practice on their Mississippi River levee work has been to use six 4x10 inch planks under each side of the machine, laid side by side in the direction in which the machine is traveling. As a general rule six sets are used, two under the machine two in front and two which the machine is just leaving behind. When the machine has passed over the last set, two men start to work piling the planks in two piles, three high. This is facilitated by a pair of tongs like ice tongs hung at the middle of a six foot pole. This pole acts as a handle a man taking each end. Around the pile is swung a seven or



Swinging planks from rear to front of dragline.

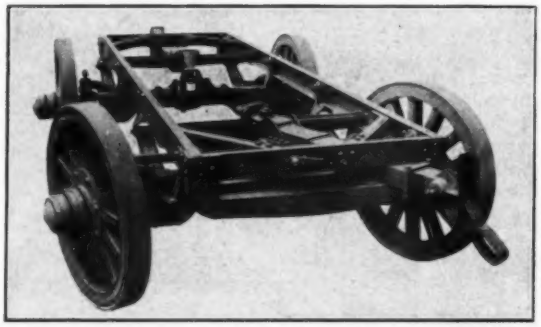
eight foot noose chain. When all is ready the machine, which has been digging, swings around, and the loose end of the chain is slung around the dragline rope. This is drawn taut by holding the dragline and hoisting the bucket slightly, which lifts the load from the ground. The timber is then swung and dropped in front, as shown in the photograph, with the loss of but a few seconds digging time. Three men handle the planks, two as before stated, with the "ice tongs" pole lift one end while the other man with a similar pole manipulates the other end and pushes the plank in place. He places one end of the pole on the top of the plank, the outer prong of the ice hooks under the end of the plank and allows the other prong to hang idle. By lifting on the outer end of the pole, he is able to lift his end of the plank and push it in position on the ground before the dragline. By this simple device the labor of moving timber and rollers can be done by three men with great saving of time and labor.



DEVICES YOU OUGHT TO KNOW ABOUT

The Efficiency of Motor Trucks with Trailers.

The auto trailer is a comparative new comer in the contracting field, and yet its application has grown so rapidly and has evidently proved so successful that it is incumbent upon those contractors, who have not looked into the matter, to investigate the cost of its use in comparison with the methods they are employing at present.



5-ton Troy Auto Trailer, showing construction.

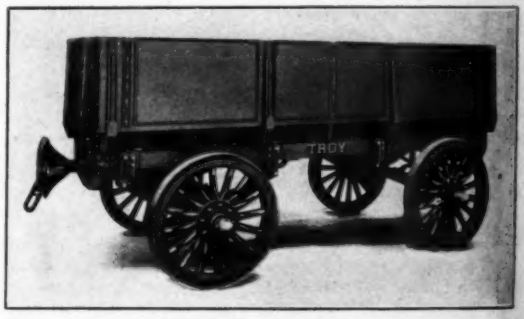
Within the last year there have been a number of exhaustive tests made, which indicate in a very strong manner the extraordinary economy of the trailer. A number of these tests were very carefully and very thoroughly described in an article by Mr. Morgan Cilley, consulting engineer of the Troy Wagon Works Company, of Troy, Ohio, in the Engineering Record for February 1st, 1913. As a result of these and other tests, Mr. Cilley arrived at several interesting conclusions.

The first test described was made at the request of the Troy Wagon Works Company, by Mr. R. T. Dana, of the Construction Service Company, of New York. This concerned the relative cost of the operation of reversible dump wagons of 3 yard rated capacity handled in trains by a tractor and 1½ yard team wagons. Four road construction contracts were studied. From this it was deduced that there is a big saving by trains over teams on long hauls, but that on the shorter hauls, the teams were more economical. The investigations seemed to establish that for hauls shorter than 1500 feet, teams were cheaper. Assuming, however, a two mile haul of crushed stone in a six wagon train (40,000 pounds per load) or in a two horse bottom dump wagon (4000 pounds per load), it was found that the wagon train cost 20 cents per ton and the team 46½ cents.

Observations were also taken hauling brick under average city conditions. Five conditions were considered and grouped so as to compare 1st; one team hauling a slat wagon, and one team with two dump wagons, (one loading and one in transit) with a three ton motor truck; and 2nd, comparing a motor truck acting solely as a tractor with three trailers, (one loading, one unloading and one in transit), a motor truck acting solely as a tractor with six trailers handled in pairs, and the motor truck alone. The conclusions are summed up as follows by Mr. Cilley. "For short hauls the horse-drawn outfits are cheaper than the motor, the lost time of the latter cutting down the delivery and reducing the average speed. A high combination of speed and capacity must compensate for the increased cost of the motor truck; therefore, increase of capacity without a corresponding decrease in speed tends toward the solution of the problem.

In the majority of cases, especially in city railway yards, bins or mechanical handling devices are impossible. To solve the problem under these conditions the trailers were tried. In the absence of specially designed trailers makeshifts were tried, such as team wagons with stub tongues and the larger traction drawn wagons; but all were found to be impractical at the usual speed of the motor truck.

A trailer must be able to stand the stress of higher speeds; must have plain, stout, well lubricated bearings; must track perfectly with the motor on curves; must be reversible, so that it can be pushed or drawn at will; and must be small enough to be used easily in trains, so that by its ease in handling the lost time will be reduced to a minimum. It should have springs, automatic steering devices and



5-ton Troy Auto Trailer

shock absorbers. By the use of such trailers, designers of motors will find their problems greatly simplified, because a large percentage of the damage to the motor truck is due to the shock of the unloaded work. Springs designed for heavy loads are so stiff that they make the truck practically springless when running light."

UMI

The Engineers Record comments editorially on Mr. Cilley's conclusions, that it is more economical to operate trailers than to use the motor truck for carrying. We quote from the editorial as follows: "He concludes that it is in general more economical to purchase and operate trailers carrying all the load than to delay an expensive motor truck for loading and unloading. At first thought it seems anomalous to have a motor truck capable of carrying a large load acting merely as a tractor; however, this use is exactly parallel to the railway locomotive, which is a tractor only and carries no load other than its own fuel and water. If Mr. Cilley's conclusions are bombproof the motor truck for heavy haulage may become merely a highway locomotive, stopping at terminals only long enough to drop one train of trailers and pick up another. Aside from operating cost, the factor of depreciation would probably be materially affected by this method of operation. The most serious racking to which a heavy motor truck is now subjected is in running light. Stiff springs, designed for carrying a heavy load, do not act as springs when the body is light and consequently all the unevenness of the road, except such as is taken up by the rubber tires, is transmitted to the whole truck. If, however, the truck itself is not to carry loads it can be designed accordingly, with the result that the racking can be largely eliminated and the life prolonged".

The daily tonnage delivered in the five conditions of hauling described above are as follows:

Length of Haul	One Team One Wagon	One Team Two Wagons	Motor Alone	Motor and Three Trailers	Motor and Six Trailers
½ mile	27	45	42	160	280
1 mile	18	26	36	140	260
2 miles	12	13	30	85	160
3 miles	9	10	21	60	110
4 miles	6	6.5	18	50	100
5 miles	6	6.5	18	35	70

The comparative ton-mile costs under the five conditions are given in the following table:

Distance of Loaded Haul in Miles	One Team, One Wagon, Cost Per Ton-Mile	One Team, Two Wagons, Cost Per Ton-Mile	Motor Alone, Cost Per Ton-Mile	Motor and Three Trailers, Cost Per Ton-Mile	Motor and Six Trailers, Cost Per Ton-Mile
½	0.444	0.258	0.480	0.210	0.258
1	0.319	0.222	0.319	0.154	0.167
2	0.256	0.205	0.240	0.143	0.118
4	0.221	0.196	0.200	0.137	0.106
6	0.214	0.194	0.186	0.135	0.104
8	0.209	0.192	0.179	0.134	0.103
10			0.176	0.134	0.103

This table indicates a most remarkable economy. There is absolutely no doubt that the trailer more nearly solves the problems of heavy hauling than anything that has heretofore been proposed. Careful supervision is necessary, however, and above all, the use of proper equipment.

To meet the growing demand for a correctly designed trailer, The Troy Wagon Works Company, of Troy, Ohio, have put on the market a new auto trailer. It has a capacity of five tons and is absolutely reversible, i, e, it may be attached to the truck at either end. It is so designed that it will follow in the path of the truck and will track with it around any corner or into any opening.

The trailer which is illustrated herewith is the result of a year of careful experimenting and has been tested out thoroughly under very exacting conditions.

Cyclone Drill Co., Active.

The Cyclone Drill Company, Orrville, Ohio, report their business at the top notch. For the past two months the quarries have taken about 20 % of their total output.

Since the work started on the L. & N. R. R. fortyeight Cyclone Blast Hole Drills have been placed on the various contracts.

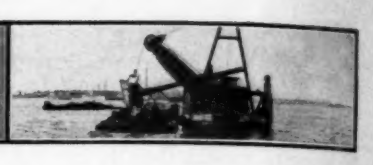
The prospects for the balance of the year is all that could be desired. Up to this time the sales have exceeded any previous year.

Hoisting Engine Bargains.

The Walter A. Zelnicker Supply Company, of St. Louis, Missouri, have recently purchased an unusually good lot of hoisting engines, which they are sacrificing for quick delivery. The engines were all built by the Lidgerwood Company. Six of them are of double cylinder double drum type, with the boiler included. Two are of the double cylinder single drum type, without the boilers. They range in size from 6″x6″ to 8½″x12″.

The September number of Zelnicker's bulletin No. 999 has been published a little ahead of time in order to be circulated at the Hoo Hoo annual convention held in St. Louis. It is merely a part of their regular eighty-four page bulletin, but gives a stock list of the equipment the company have on hand. This includes a very large and impressive assortment of locomotives, boilers, rails, bars, etc. Anyone in the market for equipment of this description, would profit by sending for this bulletin.

SHOTS FROM THE FIRING LINE



Alabama

Notes from Birmingham.

By R. S. Byron

Mr. O. O. Ogden of the Southern Dredging Co. is installing a class 14 Bucyrus drag line on their Southwood, Louisiana, job to work in conjunction with their class 24 Bucyrus machine. The class 14 machine is to follow the class 24 machine and do the topping and trimming of the levee.

There is a nice piece of drag line work to be awarded on October 1st. at Shreveport, La. The work consists of building a canal six miles long, 75 ft. wide at the bottom with a 1½ to 1 slope and 16 feet deep with a 25 foot berm. The work will have to be done wet at the upper half and dry at the lower half. It consists of 1,000,000 yards. The work is situated on the Texas Pacific Railway and about two miles from Shreveport, La. The canal is to drain a large area and is also able to take care of the high waters in that district, so caused by the Red river. The work is to be awarded by the Cadda Levee Board of Shreveport.

Mr. O. O. Ogden of the Southern Dredging Co. has completed his levee work at Baton Rouge, La. and has moved one of his class 24 Bucyrus drag lines on to his new levee work at Southwood, La. This work consists of building a new levee and contains about 150,000 yards of excavation. Mr. Ogden moved his machine from Baton Rouge to Southwood on a barge which is a distance of sixty miles by river. The time taken to move this machine from time of starting to load on barge to time of having machine ready to work on Southwood levee was 38 hours.

Mr. Ogden advises that his work at Donaldsonville, La. on the west side of the river is moving along very nicely. He is using a class 24 Bucyrus drag line on this work.

The Hearin & Ryan Co. of Baton Rouge La. have a large contract of building levees on the Mississippi near Port Allen, La. The work amounts to about a 1,000,000 yards. The above company is using two gravity orange peel bucket machines on this work and have just purchased a class 24 Bucyrus dragline for this work.

The Dameron & White Co. of Baton Rouge, La. have just been awarded a contract by the State Board of La. for building levees near Vicksburg. The work amounts to about 350,000 yards. They will use dragline on this work.

Mr. E. M. Alexander of Asheville, N. C. has just finished a piece of work which he had under the Asheville Construction Co. on their L. & N. work near Morris Ala. Mr. Alexander is now open for a piece of rock work and can get his outfit on it immediately. A letter addressed to Morris, Ala. will reach him.

Mr. C. E. Herring is at Lewisburg Tenn. operating a 65 ton Bucyrus shovel for Toney & Lawler on their L. & N. work.

The Reynolds Henderson Co. of Morris Ala. have just been awarded a contract by the L. & N. Ry. consisting of about 60,000 yards of nice digging. The work is building a branch line from the L. & N. main line to the Indio mines a distance of about five miles. They will use their Class 14-B Bucyrus revolving shovel on this work.

The Crow Contracting Co. of Mt. Pleasant, Tenn. are just installing a new Class 14 Bucyrus dragline equipped with a caterpillar traction outfit. This machine is to be used for stripping phosphate for the Federal Chemical Co. It is quite a large job and will take about three years to complete the stripping.

Mr. S. R. Oxford has just returned from Panama after having spent three years on the canal operating Bucyrus shovels. Mr. Oxford states that work is gradually coming to a close, many shovels being laid in and that the Panama canal will soon be a realized fact. He also comments very favorably on the treatment of employees at the hands of the government.

Harris & Crow of Lakeland, Florida have just closed a large contract for stripping phosphate in the vicinity of Mulberry, Fla. This company have purchased of the Bucyrus Co. the largest dragline excavator ever built, it being equipped with a boom 125 feet long and three and half yard bucket and will weigh complete 200 tons.

Charlie Crow of Mt. Pleasant paid Birmingham a visit recently and in addition to visiting "Grandpa" took in a ball game or two.

William Lucas of Toledo, Ohio was a caller last week. Mr. Lucas has been running a Victor shovel on J. C. Carland & Co's work at Garden City, Ala.

Mr. James Downey of Downey Bros. Construction Co. of this city is spending some time in the east and at this writing is taking in the sights in Boston.

California

Los Angeles and Vicinity.

By G. H. Hutchinson

Robert Sherer & Company, of Los Angeles, have been awarded a contract for grading ten miles of line from a point west of Seeley to a point four miles west of Coyote Wells, in Imperial Valley. They also have been awarded ten miles of very heavy steam shovel work in Mexico, by the San Diego & Arizona railroad company. The contractors have three steam shovels, six dinkeys, forty 4-yard Western cars and a large bunch of stock on the Mexico side of the work, and are pushing the work rapidly.

Charley Crowley, of Robert Sherer & Company, who has been bothered for the past two years with an aggravated case of rheumatism, has returned from a hospital in San Francisco, and is very much improved from his treatment there. Mr. Crowley's family and maid are at Coronado at the present time while he is looking after his interests in Mexico.

If Charley had not been as tough as a Texas bronco, he would have been down and out long ago. His associates and employees, it is needless to say, are delighted to see him back on the job again.

Grant Brothers are getting along finely with their contract with the Pacific Electric, building 14 miles of double track for the electric line from Uplands to San Bernardino. At present they are operating a Bucyrus 70-ton shovel, two standard gauge 50-ton locomotives, twelve 12-yard Western air dump cars. They have recently opened up a big cut containing 225,000 yards; width of cut 95 feet, averaging about 30 feet in depth, fine digging through an orange orchard.

Chris Bruckman is in charge of the camp, which is one of the finest we have ever visited. The porterhouse steaks come from the Cashon Ranch in Arizona, and are about the size of a door mat, and are prepared by an imported chef, (Jap). Their refrigerator contains very good things for a "Desert Rat".

The shovel is operated by Joe Labell, W. H. Hogan, (another Frenchman) cranesman, and D. A. Webb, fireman. Joe says the 70 can do everything but talk French.

The Company consists of James Grant, Dan Grant, Jim Cashon of Cashon, Arizona, Johnny Burton and Chris Bruckman, all Canadians except the latter. We hope some day to have an interesting article as to why they left Canada.

UMI

Harry Billon, a Leadville '79er has subbed the concrete work from Grant Brothers, consisting of 12,000 cubic yards. Our friend Dillon met with an accident,—he stubbed his toe, (Jim Cashon has another name for it) trying to find the refrigerator at 2:00 A. M. Have not learned whether it was Grant Brothers refrigerator or his own, we have a suspicion he was after a porterhouse. Dillon's camp adjoins the Grant Brothers, and is run a la Cabaret.

We have inspected the work and when completed, looks as though it was sand-papered. It is the finest piece of work in the west. Harry divides his time, when off the job, between Phoenix and Los Angeles. We have not learned that he was ever a resident of Utah.

Harry V. Knowles is running a type "O" Thew for Wattson & Spicer, in cellar work in Los Angeles. We hope to see Harry on the new 18-B when it arrives, as he is one of the best and we like to see a good man on a good machine.

Barney Karnes is still operating a type "O" Thew for Jim Hill in the city of Los Angeles. We believe before long he will have his employer talked into purchasing a Bucyrus for him. We are willing to do our part towards making Barney and Hill satisfied in this respect. It is needless to say that we appreciate Barney's kind offices in this matter.

Steam shovel engineer, Billie Gallagher, has been quite active in connection with his regular duties of operating a 60-C at Pecoima recently, and we understand has purchased one or two rooming houses in Los Angeles. We tried to find the location of these places, but on taking up with the purchaser he refused to give us the location as he stated he was going to be a little particular who he let in, he did state, however, should any of the steam shovel boys come in they would always find an open door and a welcome.

There is no doubt but what Bill will make a genial proprietor, and we understand, is, at the present time, fitting himself for his new duties. We are informed that he has been taking some lessons in French. He is having a burglar-proof safe installed so that the boys, when they come in, can deposit their valuables and save themselves a lot of trouble in trying to get rid of it in other ways.

Canada

Notes from Montreal

The Dominion Dredging Co., who have the contract for section 1 of the New Welland canal, have placed an initial order with Mussens Limited for one 85-C Bucyrus shovel and one Class 24 Bucyrus drag line.

Section 3 of the Welland canal, which amounts to over nine and a half million dollars, was awarded to Messrs. O'Brien & Doheny of Montreal on September 4th. Section 3 is the heaviest section of the canal. It is principally rock excavation and there is a very large amount of concreting.

The Cook Construction Co., who have the contract for the extension of the Montreal City Aqueduct, have purchased two Bucyrus drag lines. One of these has arrived on the scene and they hope to begin operations at once.

The Cook Construction Co., are also contractors, along with Wheaton Bros. on the new Halifax terminals. They have purchased two new 85-C Bucyrus shovels for this work.

Steve Pode and George Hardy, who have been on a Marion 45 at New Glasgow, have left to work on the Cape Cod canal.

There will be considerable double tracking done on the Intercolonial railway within the next year. Tenders are being called now for some short sections.

Foley, Welch & Stewart have purchased one 85-C and one 100-C Bucyrus shovel for the heavy work on the new Rogers Pass tunnel for the Canadian Pacific railroad in British Columbia.

Winnipeg Notes

The rate-payers of Winnipeg will vote upon a By-Laws on October 1st, to raise thirteen and half million dollars to pay for the cost of furnishing the city of Winnipeg and surrounding towns, (to be known as "The Greater Water District) a supply of pure soft water, and the following are a few of the chief points taken from the report made by the Board of Consulting Engineers recently:—

Shoal Lake alone will supply Winnipeg with water until the population is 850,000 and together with the Lake of the Woods forever.

Estimated cost $13,045,600.

Time to construct, five years.

Supply 85,000,000 gallons a day.

Total length of aqueduct, 95.35 miles.

Waters of Shoal Lake are pure, clear and soft.

Water will be brought as far as one mile east of Transcona by gravity.

If filteration should ever be necessary, a plant at Transcona will be constructed.

A concrete adqueduct will be constructed from Indian Bay an arm of Shoal Lake to Transcona.

From Transcona a five-foot steel pipe will be constructed to the Red river. A five-foot cast iron pipe, in a tunnel, will convey the water under the river, and thence a four-foot cast iron pipe laid in the streets of the city will deliver it to the reservoirs at McPhillips street.

A curved dyke a mile long, will be constructed for the diversion of the Falcon river into Snowshoe bay, an offshoot of Shoal lake. This is to keep the waters from that river from contaminating the waters of the big lake.

A ditch 3,300 feet long 35 feet wide and 7 feet deep will be built to help divert the Falcon river.

The intake at the lake will be located at the northwestern corner of Indian Bay.

Later a new storage reservoir, holding 250,000,000 gallons, and costing between $300,000 and $400,000 will be built one mile east of Transcona and a pumping station will be established there to send the water on to Winnipeg.

A submerged conduit will be constructed to bring the water from a point at least 150 feet from the shore of Indian Bay at the lake.

The annual cost of operation and maintenance will be $40,000 a year.

Board of consulting engineers, Rudolph Herring. Frederick P. Sterns and James H. Fuertes.

Administration board of Greater Winnipeg water district; Mayor Deacon, Controllers McLean, Douglas, Cockburn Midwinter; A. R. C. Manning of Fort Garry, Mayor Berry of St. Boniface, Reeve Henderson, Kildonan, Reeve Wilson, St. Vital.

T. W. Gough is operating a 70-ton Bucyrus steam shovel No. 4 for J. D. McArthur Company on the Hudson Bay Railway construction at Le Pas, Man.

Messrs. Thos. Kelly & Sons have now completed the excavation for the new three million dollar Manitoba government Parliament buildings, and recently commenced placing the concrete in the cassions. They expect to complete all of the cassions, which number two hundred, and which extend to a depth of some 70 feet, before the winter sets in.

Fredericton, N. B.—James Hickey is running a 70-ton Bucyrus shovel here for J. H. Corbett. Mr. Hickey has operated Bucyrus shovels for ten years.

Trenton, Ontario—R. R. Kamp is operating a 70-C Bucyrus shovel here for the Dominion Construction Co., Ltd.

Victoria, B. C.—Seattle contractors associated with A. J. McDonald, Victoria, B. C., have been awarded a contract for

20 miles of the new line which the Canadian Northern is building out of Victoria.

North Transcona, Manitoba—Ed. Norris is operating, W. White craning, and Dennis Stainbrook is firing a 70-C Bucyrus shovel for John Marsh here. Riley Irone, C. C. Phillips and John Reader are operating a 95-C Bucyrus shovel on the same work.

The shovels are digging ballast for the new Canadian Pacific Classification Yard that is under construction near Winnipeg. They expect to finish work before the middle of November.

Kirthroad, Ontario—A. Wagnor is operating a 70-C Bucyrus shovel for J. H. Corbett.

Florida

Deland—There is a large amount of land in this vicinity suitable for making brick clay, sand lime brick, silica brick, concrete block and cement. There is a considerable amount of this land for lease or for sale. Any one interested should get into communication with Mr. E. R. Ropes, Deland, Florida.

West Palm Beach—The State let contract to Ben Johnson & Co., Miami, and Furst Clark Construction Co. (main office, 1515 Fidelity Bldg., Baltimore, Md.) to construct West Palm Beach State drainage canal, which will afford continuous open waterway from Lake Okeechobee to Lake Worth and West Palm Beach; former company will dredge canal from Lake Worth to edge of glades west of Lake Clark, and latter from there to Lake Okeechobee, total length 42 miles; width at top 80 to 100 feet; depth from 9 to 10 feet; dredge 6,000,000 cubic yards material; estimated cost $500,000.

Idaho

Idaho Falls—The Oregon Short Line has completed surveys for a line which will run from Idaho Falls, Idaho, to the entrance of Taupphaus park.

Illinois

Chicago and Vicinity.

Healy & Finerty, Sewer Contractors, Chicago who are using a 70-ton Bucyrus shovel on the sewer at Ciciro, Ill. are making good progress with the work.

Fred R. Jones, City Hall Square Bldg., Chicago, who secured the government work at Cairo is installing a new 70-C Bucyrus for the work.

E. E. Headley & Son, Muddy, Ill., has a contract to build a large reservoir at Muddy, Ill. and has purchased an 18-B Bucyrus revolving shovel.

Chas. Webber is running a Class "E" Vulcan shovel for the Elmhurst-Chicago Stone Co., Elmhurst, Ill.

The Brownell Improvement Co. have moved their 14-B Bucyrus shovel from Indiana Harbor, and are now using it stripping their quarry at Thornton, Ill. Ed. Lawman is running it.

John W. Farley, who has the contract for the Albany Avenue sewer in Chicago, is making fine progress with the work. He is using a 45-ton Bucyrus and a Little Giant for the excavating.

The Lewisburg Stone & Gravel Co., Lima, Ohio, have opened a new gravel pit at LaFayette, Ind. and are using a Class "E" Vulcan shovel.

The National Fireproofing Co., Hobart, Ind. has installed a new 18-B Bucyrus revolving for digging clay at Hobart.

Cairo—Fred R. Jones Company are building a levee around the south end of Cairo. They are operating a 70-C Bucyrus shovel on this job. The work includes 250,000 cubic yards of levee, and flanks the old one that is about 6 feet higher. C. R. Cummings is superintendent, W. A. Davis, walking boss, W. A. Farrell is operating the shovel, Chas. Johnson is craning and Sam Wampler is firing.

The Walsh Construction Company of Davenport, Ia., have another piece of levee work here.

Alton—Mulvill Bros. have finished their work for the Alton Steel Co. at Alton, Ill. They have 28 teams and two machines idle.

Bridgeport—The Bridgeport & Southern, of Bridgeport, Ill., has been incorporated with a capital stock of $25,000, and proposes the construction of a line from Bridgeport in Lawrence county, through Lawrence and Wabash counties, to Mount Carmel, a distance of 30 miles.

Indiana

Disko—D. G. Moss is operating a 95-C Bucyrus shovel for J. B. Carter & Co.

Iowa

Tama—McInerney & Kelly expect to finish their work here within the next two weeks and will have 35 teams, two machines and a lot of wheelers idle.

Kansas

Notes from Pittsburg, Kansas.

By W. S. Russell

The middle of September saw an extreme change in the weather, the long drough being broken up by copious rains and the temperature reduced from the 100 range to 70 degrees or less. This cool weather stimulates the coal trade and prices are advanced as follows: Lump, $2.25; Nut, $2.00; Slack, $1.35; Mine run, $1.75 per ton F. O. B. cars at the mines.

The steam shovel strip mines are all working and producing better graded coal than formerly, which has caused an active demand preference for strip coal, which is encouraging to the strippers, who anticipate a good business during the coming winter.

There are 24 steam shovels stripping coal in the Kansas field within a radius of 20 miles from Pittsburg. Most of them are operated by coal mining companies, formed for the purpose within the past two and a half years. Several of them are owned by old coal companies who have been stripping with teams and scrapers for 15 to 20 years, and there are four firms who have taken contracts to strip and load the coal at a price per ton on railroadcars.

There are good openings for parties having means who may wish to engage in coal stripping, which is a very profitable business in the Pittsburg district. We know of several good fields of strip coal that may be secured either by lease or purchase. We also know parties owning land who are looking for parties with means to join them in the coal stripping business.

The cost of a plant including steam shovel, cars, track, locomotive, tipple with shaking screens, pumps, pipe, etc. will vary from $30,000.00 to $50,000.00 part of which may be purchased on several months time. Communications may be addressed to the Pittsburgh Machinery Company, Stillwell hotel, Pittsburg, Kansas.

The Pierce Coal Company of Millberry, have their stripping plant about completed, and are ready to begin shipping coal. They have a field of 160 acres and a fine quality of coal. Mr. Frank Pierce, Sr. was a guest at the Stilwell hotel last week.

The Cherokee-Girard Coal Company, whose post office address is Minden Mines, Mo., have their plant in full operation

about two miles from town and are shipping coal at the rate of about 4,000 tons per month at present, with a capacity up to over 5,000 tons.

O. S. Hubert is manager and Alex McFarland secretary. They have their office at the mines and give it their personal attention. They have 125 acres of level land, the depth of overburden being from 15 to 26 feet, the coal three feet thick.

They have a model 250 Marion steam shovel with a 75 foot boom and a 3½ yard dipper, a tipple fitted with shaker screens that loads three cars at once with lump, nut and slack. The two ton tram cars are hauled up a trestle or incline and dumped automatically at the rate of one car per minute, which gives the tipple a capacity to handle from 600 to 700 tons of coal per day of eight hours. The cars are hauled up the slope out of the pit and up the incline to the tipple by a wire rope cable operated by a steam hoisting engine located under the tipple. In the pit the cars are hauled by a 6-ton dinkey locomotive, which pulls 9 cars in a train, the full distance being about half a mile.

In order to obtain a supply of water, a well was drilled to the depth of 1000 feet. The entire plant is first class and well designed to be operated economically and is bound to be a money maker. Their steam shovel is operated by V. W. Pelton, engineer, and J. C. Steele, cranesman.

The C. H. Markham Coal Company are operating their 150-ton Bucyrus steam shovel near Curransville, about ten miles north of Pittsburg on the Frisco railroad. The overburden averages about 20 feet thick, the coal 3 feet thick is of excellent quality. Their office is in the Globe building, Pittsburg, Kansas.

J. J. Stephenson has returned from his trip to Vermont and is hooping things up at his North Pittsburg coal stripping plant in the absence of his son William, who is enjoying a vacation in Colorado.

Harry Miller of the Pittsburg-Scammon Coal Company has returned from his Wyoming trip and will tell you about the greatest coal stripping proposition in the world.

E. J. White and C. D. Smith of Smith, Scott & White, coal stripping contractors, are on a western trip to Portland, Seattle and Vancouver. They will return about October 1st.

Alex Besse, of the Besse-Cockrill Coal Company has returned from a trip to Chicago.

W. J. Lester, a contractor of Pueblo, Colorado, was here the latter part of August looking over the coal fields, and investigating the coal stripping. He was very much interested in the operations of the big coal stripping steam shovels and is figuring on taking a contract.

Robt. A. Gray of Weir City, has returned from a trip to the old country, having had a pleasant time.

The Patton Coal Company of Frontenac, Kansas, have secured a contract from Jackson and Walker, of Wichita, Kansas, to strip and load about 300 acres of coal ore near Frontenac for the Santa Fe railroad. They will install a complete steam shovel plant as soon as possible.

The 185-ton Bucyrus steam shovel purchased by the Nesch Coal Company at Pittsburg, is being installed at Frontenac, and will soon commence digging. E. P. Hayward is erecting engineer for the Bucyrus Company.

Kentucky

Winchester—P. B. Lee is at present with Johnson & Briggs at Camp No. 2 near here, on their L. & N. work. He states their 70-C Bucyrus shovel is working in solid rock. It has been digging day and night.

Hugh M. Johnson is craning the shovel.

Louisville—It is reported that survey for the proposed 35-mile extension of the Baltimore & Ohio R. R. from Beaver Creek to Jenkins, in eastern Kentucky, has been completed and that contracts for construction work will be let in the near future.

Louisville—Adams & Sullivan, 215 South Fifth avenue, Louisville, have been awarded contract for construction of Rockhouse creek branch of Lexington & Eastern Ry., from Blackey up Rockhouse creek to a point two miles above Deane on its headwaters, 18 miles through coal and timber section.

Pikeville—The Baltimore & Ohio R. R. will build a railroad up the left hand fork of Beaver creek to connect with its route up Shelby creek, and the connection will be made at Jenkins. The route will require many bridges and tunnels.

Louisiana

New Orleans—The New Orleans, Southern & Grand Isle is planning to begin work this fall on a line from Amesville, near New Orleans, to Westwego.

Massachussetts

Bournedale—Ed. M. Clark is operating a Bucyrus 70-C shovel for E. W. Foley Construction Company on the Cape Cod canal.

Boston—As we predicted the work on the grading for the Southern New England Ry. (Grand Trunk Ry.) from Palmer to the Rhode Island state line is under way. John Marsch, Chicago, Ill., is the general contractor. The time for completion of the work on the Webster division was further extended to July 1, 1914.

Michigan

Princeton—John Van Brocklin is operating one of the Cleveland Cliff Iron Company's 70-ton Bucyrus shovels here. His address is post office box 173.

Minnesota

Duluth—The Duluth & Iron Range has given a grading contract to Charles M. Magrinson, for work on a logging line from mile 108 near Robinson station, Minn., north to Burnside lake, 3.18 miles. The grading work which involved handling 10,000 cubic yards to the mile is 90 per cent completed and the company will carry out the track laying with its own forces.

Missouri

St. Louis Items.

By A. J. Michel

A. J. Michel has recently returned from a 30 days vacation and rest in and above the Rocky mountains near Denver.

J. W. McMurrey was awarded the contract near the mouth of the Missouri river for revetment and levee work. Mr. McMurrey sent east to purchase a steamboat to carry on this work and will buy barges in this vicinity soon.

The Grafton Quarry Co. have a contract securing rip rap for the various river jobs in Missouri, Illinois and Iowa that will keep them busy all winter.

J. V. Crawford an A No. 1 steam shovel engineer is in St. Louis and idle at present. Anyone needing his services may get him at 133 Wise Ave., St. Louis, Mo.

Zay Gardner, foreman of the M. K. & T. Oklahoma district, gave us a call the other day. Zay is proud father of a 12 pound boy. We hope he will be a G. M. or V. P. some day.

Ton Gavin has the contract for about 100 miles of pipe line work on the P. O. & G. line in west Missouri on one end and J. Corcoran Co. about the same amount at the farthest end of the line. They report fine progress.

Columbus S. Jones the hustling station contractor has an outfit idle at present. He has a complete team and wheelbarrow outfit as well as a small Thew shovel. Anyone knowing where he might land some work can reach him by wire in care of the Michel Labor Agency, No. 9, South 9th Street, St. Louis, Mo.

Jones has just finished on the Wabash where he has been busy for over one solid year.

Rust & Swift the leading river contractors on the Mississippi have just purchased the steamer Lawrence and added several new barges to their present equipment.

W. H. Thompson has a six team outfit idle. His present address is McCausland & Clayton Rd,, St. Louis.

While in Denver the writer had the pleasure to meet J. A. Allen and Geo. Watson the two leading labor agents in the western country. They report very little doing this year and seem very pessimistic in their views as to the market for new work this fall and winter.

Another hustling labor man as well as team contractor in Denver that the writer had the pleasure in meeting was T. Davis. He has his outfit working full blast in the neighborhood of Denver.

Louis Carlton who dropped out of sight here some years ago is alive and doing well in Colorado. The "Swede", as he is familiarly known, has fully recovered from an accident some years ago and looks like the same hustling superintendent he always was.

Labor is plentiful around St. Louis at present, 20 men for every job. The boys who laughed at $2.00 per day some two weeks ago are bowing gently at offers of $1.50 at present. Contractors needing men write or phone Tony Michel.

It is stated that the Wabash will do additional double track work between Brunswick, Mo. and Omaha, Neb. O. A. Cunningham, St. Louis, is chief engineer.

The Walsh Construction Co. are busy with their levee work near Cairo, Ill. The work is started full blast. This is about a $250.000 job.

They have a large number of Austrians on this work.

Several team contractors here who are looking for work for their outfits. Write Michel and we will help you cover your work.

John Kenney has nine dandy teams idle Write him to Afton, Mo.

List & Gifford secured over two miles of heavy steam shovel work on the Alton I. & S. R R. just across the river recently. They will start this work very soon.

Charleston—Wm. McCarty, levee and railroad contractor, Charleston, Mo., R. R. No. 2, will finish his present work Oct. 1 and will then be in the market for work for a 35-team outfit, engine and grader.

Montana

Butte—The Butte, Wisdom & Pacific, which was recently incorporated with a capital stock of $3,000,000, will construct a railroad from Divide, Mont., to the Big Hole river. The road will be about 128 miles long. Construction work is to begin this fall.

Nebraska

Omaha—Candon Bros., 1406 W. O. W. building, have 20,000 yards of quarry stripping to let at Lewisville, Neb., about 25 miles outside of Omaha on the Burlington and Missouri Pacific railroads. Will pay 21c per yard. Short haul. Suitable for small shovel or scrapers.

New York

New York and Vicinity.

By A. J. Atwood

The Beaver Construction Company have just signed up a contract for building the large reservoir on Staten Island for the city of New York—this work is to be completed in three years, and Mr. T. J. Hendrie is superintendent of construction and in active charge of the work. We understand that several new steam shovels have just been purchased and will be put in operation very soon. The conditions near the city for labor and general supplies seem ideal and we wish the company all success.

The Stone & Webster Engineering Corporation Co. of Boston, Mass., have several very fine contracts now under way, all seem to be pushing on toward a successful completion. They are now working at Falls Village, Conn. and at Torrington, Conn. and have another good piece of work at Peekskill, N. Y., on all the above work is being pushed as rapidly as possible.

We received a call from our old friend J. R. DeWitt a few days ago, and hope to see him in charge of large construction in the near future.

Much activity is predicted on the Long Island R. R. for those interested in dirt moving for the coming year.

Winston & Company on their work on the New York Aqueduct at Brown Station, N. Y., report camp filled with laborers and carpenters and skilled workmen and everything progressing rapidly.

Mechanicsville—Joseph Stewart & Co. are working three shifts on their contract 72A on the Barge Canal. Their 70-ton Bucyrus shovel is being operated by J. R. Fisher, Ben Lieberanz, and N. H. Proctor. J. R. Dumphy is craning for J. R. Fisher.

Brown Station—Peter H. Paterson, is operating a Bucyrus shovel for Winston & Co. here. Tony Coleman is craning for him and Clement Catolda is firing.

Brown Station—E. L. Knighton, R. D. Jones, E. R. Johnson and C. E. Satterwhite, are operating Bucyrus shovels for Winston & Co. at this point.

Fulton—Leonard C. Roy is craning a Bucyrus shovel for the Oswego Construction Company here.

Brown Station—S. A. Allen is operating a 70-C Bucyrus shovel for Winston & Co. near here.

Ft. Plain—G. Baudino is operating a Bucyrus dipper dredge for S. Pearson & Son Inc. on the Barge canal. His address is Linney block.

East Syracuse—Thomas Crisman is operating a 70-C Bucyrus shovel for the Kahl Construction Company here.

Oregon

Hood River—H. R. Golden is operating a Marion 60 shovel for Twohy Brothers here. He advises that it is a good company, a good job, and good board, but makes dark and veiled allusions in regard to his shovel.

Portland—The Portland, Eugene & Eastern, it is reported, will built extensions of the Alpine and Belfontaine in Oregon. The company will build on extension about a mile and a half long in connection with some logging operations. One of these branches is about 10 miles long and one about seven miles.

Pennsylvania

Pittsburgh—The Pittsburgh & Lake Erie has let additional contracts for extending the Lake Erie & Eastern from the Brier

Hill Steel Co's plant in Youngstown, Ohio, northwest to Niles to the McKelvey-Hine Construction Co., Pittsburgh. The contract calls for building a single track line about 10 miles long.

Cecil—P. J. O'Hara is engineer, Chas, F. Knight is cranesman and M. E. Delamey is fireman on a 70-C Bucyrus shovel operated here by Thos. Conner & Sons.

New Castle—It is reported that work will begin at once on double tracking the New Castle branch of the Pittsburgh & Lake Erie R. R. between Ferrona and New Castle. J. A. Atwood, chief engineer, Pittsburgh.

Eighty-Four—Herman Sourbuck is operating a 70-ton Bucyrus shovel for Brockelhurst & Potter. His address is R. F. D. No. 1, care of Gambles.

Montrose—Fred Michaels is craning a 70-ton shovel for P. McManus.

Alford—John R. Dempster is with P. McManus on the D. L. & W. cut-off here. Mr. Dempster advises us that the first cold winds of the season are making him turn his eyes toward Dixie.

South Carolina

Florence—Construction is fast progressing on the extension of the South Carolina Western Railroad from Florence to Poston, S. C., about 32 miles, all grading being done and tracklaying to begin immediately. Trestles under way at Jeffreys and Willow creeks. W. R. Bonsal, Hamlet, N. C., is president.

Texas

Dallas—The Dallas, Corsicana & Palestine has grading work under way which involves handling 30,000 cubic yards to the mile. The company was organized last year to build from Palestine, Tex., northwest through Anderson and Navarro counties to Corsicana. The maximum grades will be 1 per cent and maximum curvature 4 deg. The company expects to develop a traffic in lumber, cotton, lignite, etc.

Arlington—W. P. McCoy, expects to finish his work at Glen Rock, Wyo., about November 1. McCoy has 42 cracker-jack teams and a first-class grading out-fit that he will want work for.

Utah

News from Salt Lake and Vicinity.

By G. H. Hutchinson

D. S. Gerow was a caller in Salt Lake recently and states that he is making excellent progress with his work on the Utah railroad, and that he expects to be through sometime about Christmas. He has in mind spending the winter in Southern California. We know if D. S. will agree to come to Los Angeles and stay for two weeks that he will forever afterward be a permanent citizen. Through the Excavating Engineer we again extend an invitation to him to visit us, as the water is fine and the browsing is good.

Joe Thorne of Springville, Utah, was in Salt Lake for a day or two taking in the sights and renewing old acquaintances. He advises with his Model 20 and a bunch of good teams he has moved a pile of dirt that will make some of the fellows with their big outfits, envious. He is looking forward to an early completion of his present work at Black Hawk, Utah. Joe says he will be able to retire for the winter and is looking forward to a trip to California.

Clarence Crandall, manager of the Reynolds Ely Construction Company, one of the hardest working contractors in the west, was in Salt Lake, and we found him at his place of business at 10:30 P. M. trying to finish up for the day. He advises they have subbed out most of their work on the reclamation project in Colorado, and had one or two shovels he would like to have a job for. Mrs. Crandall and family are now residents of Long Beach, California, and judging from the questions asked by C. L. he is about due in Long Beach.

Tucker—V. Corey is operating a 70-ton Bucyrus shovel for Corey Bros. Construction Company.

Salt Lake City—The Salt Lake & Alta has been incorporated in Utah to build a line to the granite quarries in the Little Cottonwood canyon, and to the Alta mining district. Work is now under way between Midvale, Utah, and Wasatch on about 11 miles up Little Cottonwood canyon. The grading is finished and track has been laid on four miles.

Helper—Joseph J. Curtin is operating a new 70-C Bucyrus shovel for Young & Crook.

Washington

Spokane—Grant Smith & Co., Seattle, have been awarded contract for new union station at Spokane for the Oregon-Washington Railway & Navigation Co. and the Chicago Milwaukee & St. Paul Ry. The contract amounts to about $650,000 and includes a reinforced concrete structure, one mile of umbrella train sheds and tree miles of terminal tracks.

West Virginia

Wheeling—B. & O. has completed surveys for the new cut-off line which the road will build to establish a new connection between the Wheeling division and the Monongahela river line of the Monongah division, in West Virginia, facilitating the movement of through traffic and the handling of coal from the extensive coal fields on that section of the system.

Wisconsin

Racine—John I. Walz is digging rock with a 115-ton Vulcan shovel for the Universal Crushed Stone Company.

Wyoming

Casper—Twohy Bros., Casper, Wyo., have 215,000 yards of grader work to let on the B. & Q. R. R. between Casper and Orin Junction, Wyo.

Foreign

Africa—It is a peculiar coincidence that on September 16th, the Bucyrus Company sent two men from New York into the wilds of Africa, both on a separate errand and yet both on the same steamer. D. L. Lund, who was formerly with the Yosemite Dredging Company of California, is going to Macequece, Portugese, East Africa, where he is to be winchman on a 7½ Bucyrus placer dredge, owned by the Andrada Mines, Ltd. This dredge is an electrical built machine with a steel hull. It is now under construction and will be completed on November 1st.

Gilbert LaMair, a well known steam shovel man, is on his way to the Belgian Congo, where he is to erect two 14-B Bucyrus shovels for the Union Miniere du Haut-Katanga. The men will probably travel together as far as Macequece, and from here Mr. LaMair will travel 200 miles further into the center of the continent.

Brazil—C. I. Smith, engineer, and Fares S. Miller, cranesman, have accepted positions with the Madeira-Mamore Railroad Company operating a 45-C Bucyrus shovel in Brazil.

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2—42″x6′ Vertical Water Tube Boilers.
1—42″x7′4″ " " " "
9—48″x8′6″ " " " "
1—60″x8′6″ " Submerged Tube Boilers.
1—54″x20′ Locomotive Type.
1—54″x9′6″ Vertical Boiler.

These boilers are surplus stock which cannot be used on new design shovels now being built. They have never been used, and are offered at a sacrifice.

BUCYRUS COMPANY
P. O. Box S. South Milwaukee, Wis.

FOR SALE
Second Hand Steam Shovel Boilers

1—54″x8′6″ Vertical Water Tube Boiler.
1—54″x20′ Locomotive Type Boiler.
1—50″x8′9″ Vertical Type Boiler.
1—49″x8′9″ " " "

All in excellent condition. The last two were used less than 60 days.

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2 50 H. P. J. I. Case T. M. Co.'s hauling engines, equipped with municipal wheels, large water tanks and coal bunkers.

1 25 H. P. Reeves traction engine, with extra width drive wheels.

1 National Elevating Grader.

1 26 ton Little Giant traction Steam Shovel, with 1 yd. dipper.

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This outfit has only been used on one job at East Moline, Ill. The hauling outfit has not been used to exceed thirty days, and all in new condition and can be inspected here.

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1 Giant D Special 60-Ton Vulcan Shovel.
1 Giant D 50-Ton Vulcan Shovel.

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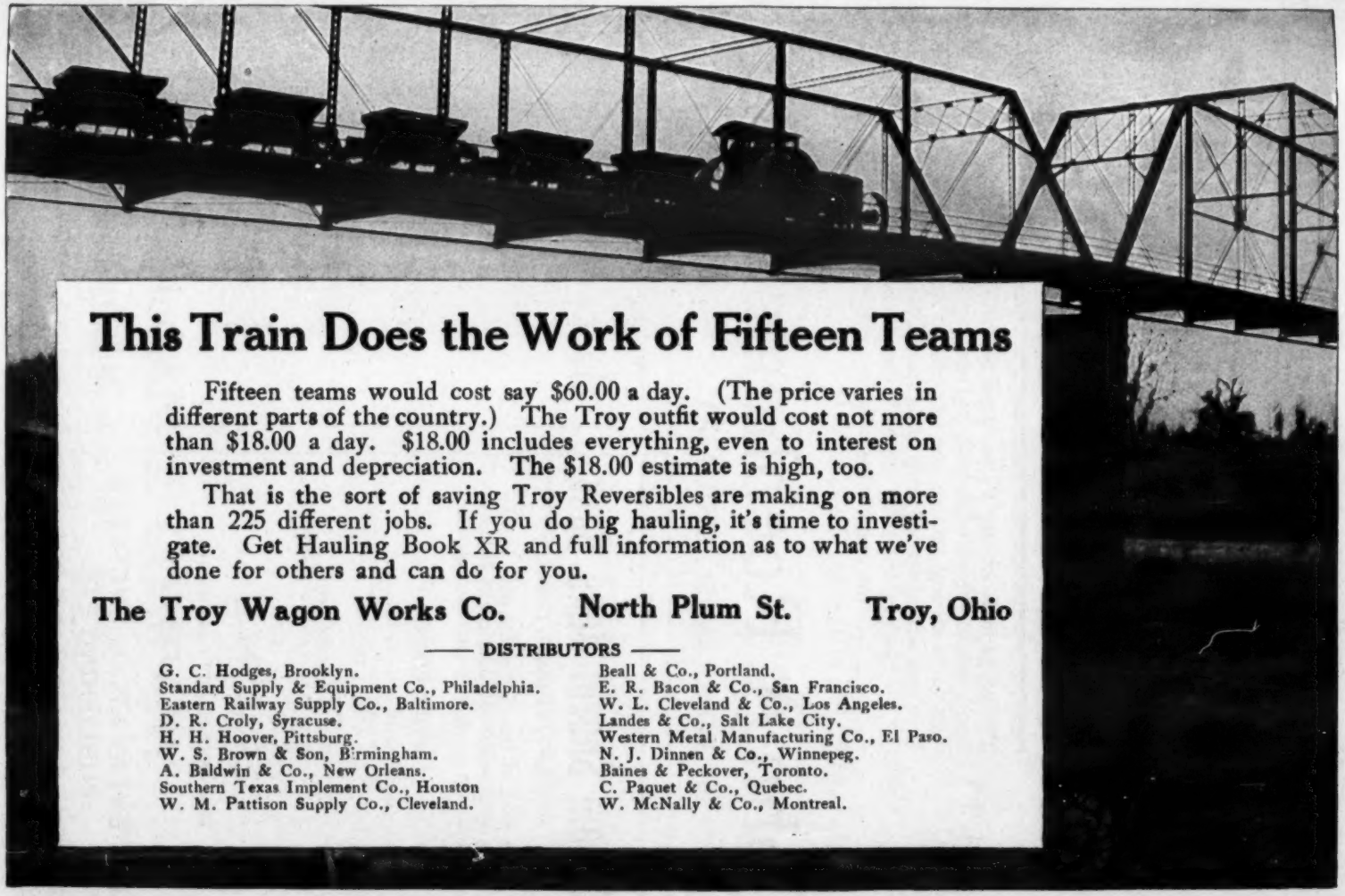

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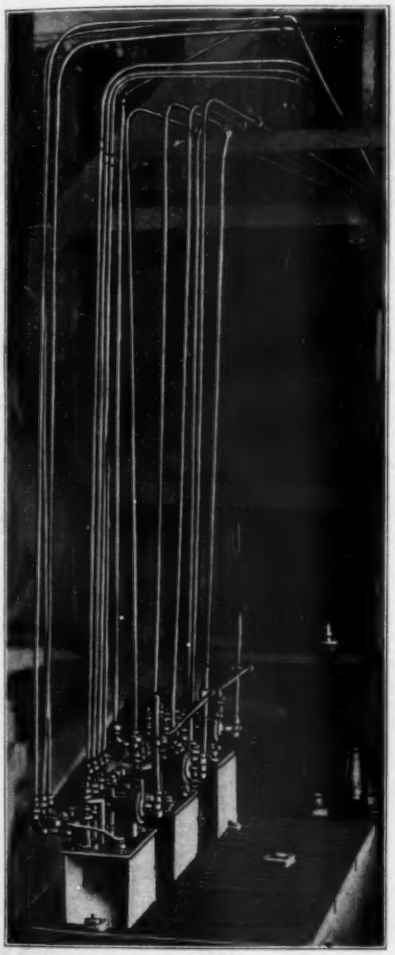

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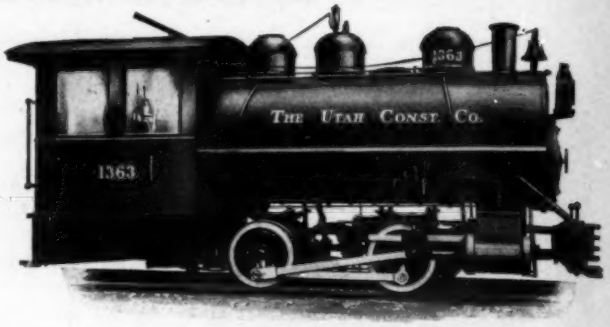

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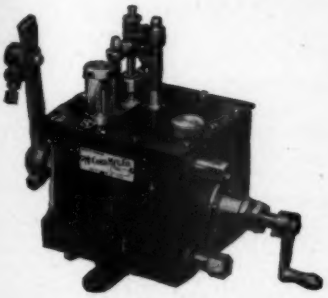

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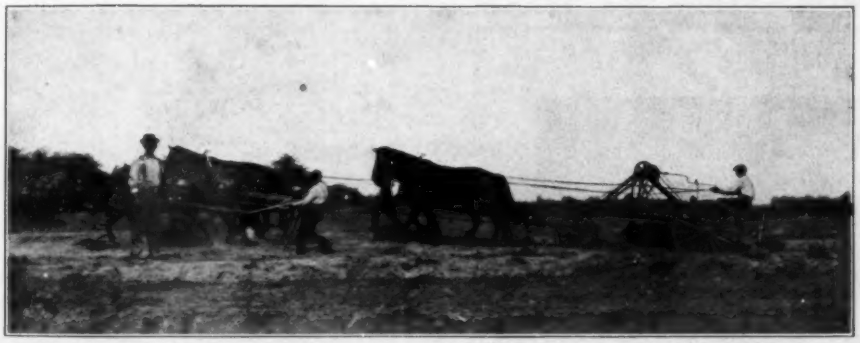

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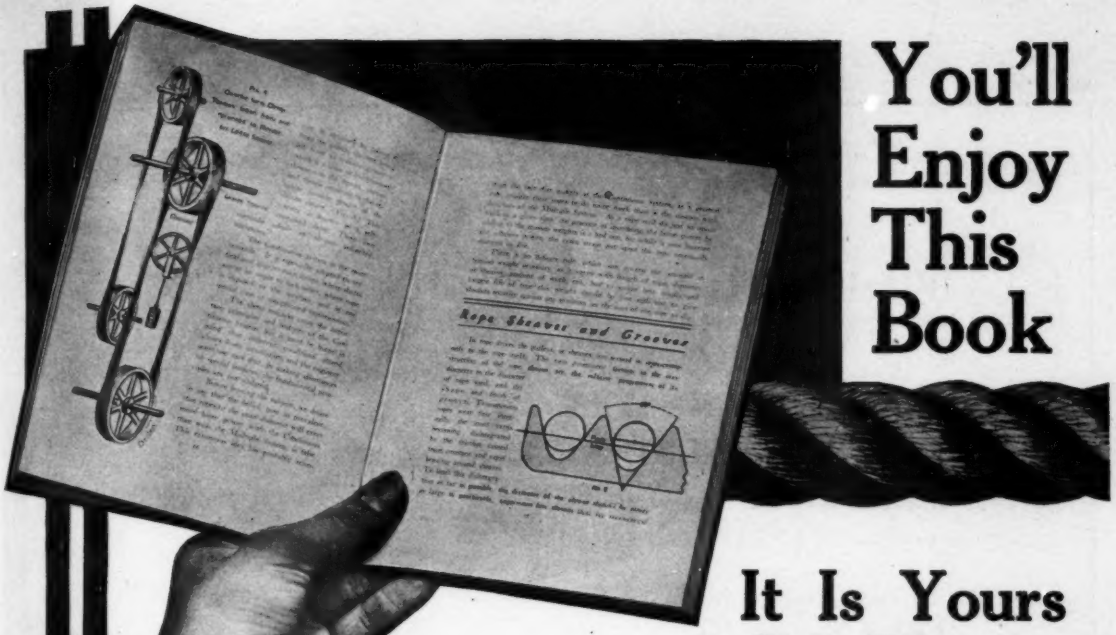

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Of this enormous amount approximately 100,000,000 cubic yards or 82½ per cent have been hauled by locomotives built by the

AMERICAN LOCOMOTIVE COMPANY

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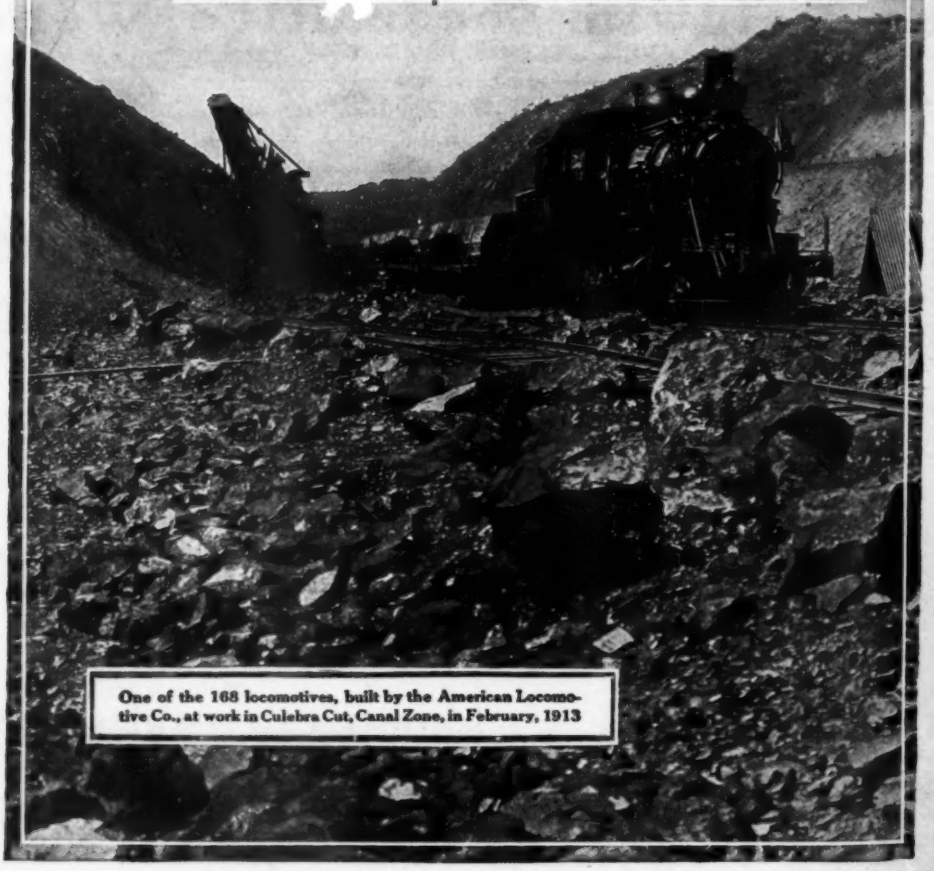

One of the 168 locomotives, built by the American Locomotive Co., at work in Culebra Cut, Canal Zone, in February, 1913